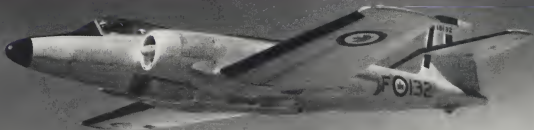


AVIATION WEEK

A MCGRAW-HILL PUBLICATION

NOV. 16, 1953

50 CENTS



How to make your shots count

A lot of work has been done by a lot of people to increase aircraft stability. And now, from Honeywell, there comes a device that greatly advances the cause of the more stable flying gun platform, so important to accurate rocket and gun firing.

This device is called a Turn Coordinating Yaw Damper. It is now in production and is currently being installed in the AVRO CF-100. That's the all-Canadian fighter, pictured above, guarding the northern approaches to our continent.

The new Turn Coordinating Yaw Damper is a significant advance over earlier Yaw Dampers. With it a pilot can fly with his feet off the rudder pedals. No matter how he moves the stick, the turn—whether transient or steady—will always be coordinated. He is relieved of his concern over yaw, and has more

positive assurance that his shots will count.

On the CF-100 the Turn Coordinating Yaw Damper is made to function as the rudder axis for the Honeywell MH-11 Autopilot, with which the CF-100 is also equipped.

The important improvement in performance made possible by the Turn Coordinating Yaw Damper serves to demonstrate how *automatic control* is such an important part of aviation progress. And *automatic control* is Honeywell's business.

MINNEAPOLIS
Honeywell



Aeronautical Controls

2600 Ridgway Road, Minneapolis 13, Minn.

The **FUEL** goes 'round and 'round and comes out **CLEAR**

HYDRO-AIRE
MANUFACTURING

- Hybrid Anti-Glide Sealing System
- Fuel Vent and Air Valves
- Electrically-Actuated Actuators
- Fuel and Hydraulic Pumps
- Jet Engine Actuators
- Fuel and Air Valves
- Fuel System Units

THE HY- $\frac{1}{2}$ " FUEL BOOSTER PUMP BEATS THE PROBLEM THAT "MAKES AN AIRPLANE'S BLOOD BOIL"

It is now several years since Hydro-Aire, named the attention of its Engineering Staff and Research Facilities to the dangerous phenomenon of vapor stall characteristics in Fuel Systems at altitude.

Preliminary consultations with leading aircraft companies led to an intensive research program. In the course of this research an entirely new principle was developed. The result of this new approach is the HY- $\frac{1}{2}$ " Fuel Booster Pump. Instead of the unwelcome fuel vapor being separated, it is forced back into liquid form in the pump.

Proof again that there are few projects too large... no project too small...for Hydro-Aire's unobalanced research facilities

*Paper-liquid ratio

HYDRO-AIRE
INC.

JEROME, CALIF. • Subsidiary of Crane Co.

Every Fighter,
Every Bomber, Every Transport
is Hydro-Aire Equipped.

B.F. Goodrich

Sealed lips hold the secret of faster maintenance

LOOKING ENGINEERS were looking for a way to seal the gap between elevator and stabilizer on the F4U-5 "Mustang" for another opinion of control. A flap seal—a long strip of cured fabric—would do the trick. But an ordinary flap seal poses a maintenance problem. Every time an elevator is taken off for service, the flap and cone be removed too. And with ordinary flap seals, there's a long costly job. So Lockheed engineers came to B. F. Goodrich with the problem. And B. F. Goodrich had the answer—the Pressure Sealing Zipper.

The zipper's overlapping rubber lips provide a 100% effective seal against pressure. As a result, the elevator controls are easier to operate. When an elevator is removed, mechanics simply unzip the seal instead of laboriously taking out the cone screw assembly. If a new elevator is installed, all that new halves of the zipper come perfectly, since all halves of the zipper are interchangeable. And the zipper makes it easier to get a sightseeing and around the house shows over the next ten to the phone.

B. F. Goodrich Pressure Sealing

Zipper can be removed from either side of metal. They are light and weight. For simply removal, complex shapes. All used on airplane doors, air ducts, interior covers, wingtips, gunnery coverings. For information on construction and applications of Pressure Sealing Zipper, write for our new booklet "Hold Everything! The B. F. Goodrich Company, Aeronautical Division, Akron, Ohio."

B.F. Goodrich
FIRST IN RUBBER



Illustration by
David Matthews & Company
Chicago

The thousand-mile handshake

When a company owned Beechcraft Executive Transport is available for business action, you and your key men find time to shake hands with solid facts, forecasts, new business prospects regularly. For example, you can have at your convenience, cruise in

relaxing comfort one thousand miles in less than five hours, tend to business, return that day. Here's what you can't pile up.

Thousands of executives use this world-famous Beech 'Twin' in just such fashion daily in their business.

you could use more time. Investigate! Typical costs and operating data on request.

Call your Beechcraft distributor or write Beech Aircraft Corporation, Wichita, Kansas, U.S.A.



Domestic

Government-owned cruise plot expected by Hughes Aircraft in Tucson, Ariz., will not be taken over by the Air Force, industry observers learned last week, despite reports that such a move is under consideration because of HASC's recent assignment to build the Avionics Wing, Oct. 15, p. 17. They say the Tucson plot depends heavily on Hughes success and development laboratories at Culver City for new and improved cruise drugs.

Lightweight absolute record of 37,503 ft. has been set by Cessna Aircraft's ultralight XL-19B and confirmed by the Fédération Aéronautique Internationale, the Wichita aircraft builder announced last week.

President Eisenhower last week awarded Herman International Trip-tician to USAF Col. Brent Roberts (retired), (previously head of Travelers) and Walter L. Mouse (less noted) chief pilot for Goodrich Aircraft Corp.

Fletcher Aviation Corp. has purchased patent rights in "jet engine" and receiving advice from Prof. Otto K. Koppen of the Massachusetts Institute of Technology in producing them at Randolph, Calif., in Continental-powered Navions.

Douglas Aircraft has delivered the first of four DC-6Bs ordered by Alitalia, Italian Airlines.

Bentley Air Lines' first Wright Turbo Compound-powered Super Constellation was delivered to the carrier's main base at Miami, Fla., Nov. 10, is scheduled to go into operation on New York Miami flights this week.

Financial

United Air Lines net earnings for the first three quarters of 1953 totaled \$3,019,115, a drop of \$235,890 from the same period of 1952. Operating losses increased 10% to \$112,641,497, but operating revenues climbed more than 15% to \$214,174,052.

Fieldair Engine & Airplane Corp., Hagerstown, Md., reports annual net earnings of \$1,468,000 for the first nine months of the year, topping profits for the same period of 1952 by \$1,709,000. Sales totaled \$138,874,000, compared with \$83,166,000 last year.



Navy Evaluates New Trainer Trio

First pilots of the three light trainers being evaluated by the Navy at Gray Field, Pensacola, Fla., share the planes in rotation. From left are T-34C, Beechcraft T-34C and Ryan 72. This is the first assessment of Beech entry in the competition. The first was first shown at Aviation Week Oct. 5, p. 7 and the Ryan was covered Oct. 12, p. 24 and Nov. 2, p. 36. Navy is studying all three to determine which is the most suitable replacement for its North American SNV.

Trans World Airlines has deposited \$4,678,000 in sinking fund and interest payments due on \$40 million borrowed in 1946 from Equitable Life Assurance Society, cutting the loan to \$28,549,000.

Eastern Air Lines ended the first three quarters of the year with a net profit of \$2,775,911, compared with \$1,771,875 for the first nine months of last year. Gross operating revenues increased 26 1/2% to \$111,144,166.

Texas Aircraft Corp., Dallas, lost net earnings of \$1,466,210 for the nine months ended Sept. 30, compared with \$1,379,394 for the same period last year. Sales totaled \$41,653,178, a 7.7% increase.

Continental Air Lines reports a net income of \$2,051,127 for the first three quarters of 1953, approximately five times the \$288,673 net for the same period last year. Sharp increase reflects Continental's sale of its Convair 440 fleet. Operating revenues climbed 8.21% to \$8,192,963.

National Airlines net income for the first quarter of fiscal 1954 totaled \$278,243, compared with \$173,215 in the corresponding period last year. Operating revenues increased to \$7,332,613 from \$6,051,175.

Carlin-Wright Corp., Wood Ridge, N. J., will pay a 15-cent dividend Dec. 24 to stockholders of record as of Dec. 8.

Ryan Aeronautical Co., San Diego, has declared a regular quarterly dividend of 10 cents on common capital stock plus an extra 10 cents, payable Dec. 11 to stockholders of record Nov. 10.

International

British Overseas Airways Corp. reports net profits of \$344,693 for the six months ended Oct. 10, a \$54,430 drop from the same period last year. BOAC blames a decrease in U.S. Britain passenger traffic for the lower profit.

Sweden's Saab 32 all-weather jet fighter has reached maximum speeds in dives during development flight tests, 1.84 Mach, for the company reports. The fastest version, powered by a Rolls-Royce Avon, is in quickly production at Saab Aircraft Co.'s Linköping factory.

Swedish Ministry of Defense is supporting for a number of British Hawker Hunters, expects to spend approximately \$14-400,000 on the jet fighters and spares.

ZP2K LANDING GEAR

Airborne Actuated



The landing gear in Goodyear's ZP2K Navy blimp is actuated by Airborne's R-104M LANDING with a 128 in. stroke Airborne electro-mechanical actuators are operated by Goodyear—and most other manufacturers of military aircraft—for two reasons: they provide high power output in a minimum of space, and they can be counted on, however rugged the conditions.

Dimensions and data on Airborne products for the aviation industry are given in the IAS Airframe and Engineering Catalog.

AIRBORNE
ACCESSORIES CORPORATION

104 Chestnut Avenue
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The Aviation Week November 16, 1953

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WHO'S WHERE

In the Front Office

John R. Baldwin, chairman of the Civil Aeronautics Board, has been appointed deputy member to its services in the Department of Transport.

William A. Pittman, president of United Air Lines, has been elected to the board of Washington Electric Corp., New York.

Russell G. Armstrong is now chairman and president of Shattuck Corp., Berkeley, Calif., according to **Elvin M. Knight**, who agreed to establish Knight Laboratories at North Hollywood. **Willis W. Brown, Jr.**, a General Electric executive, is president of the company.

John E. Mader has been appointed president of Marmon Electric Corp., St. Paul.

William F. Young has been appointed vice president of Aircraft Supplies, New York.

Ernest A. G. A. T. Wadhwa, president of the company, has been appointed to the position of Vice President, Los Angeles.

Changes

RAF Wing Commander G. Lee has moved to the position of Director, Technical Services, Royal Air Force, London.

Chas. F. Tatum has been promoted to engineering director at the Automotive Division of Minneapolis-Hussey Corp., Minneapolis.

Marvin A. Bennett has been appointed assistant manager of the Civil Aeronautics Board, Washington, D.C.

Robert R. King is now president of the company, which has been renamed the General Electric Corp., Chicago.

Walter B. Powell has been named president of the company, which has been renamed the General Electric Corp., Chicago.

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INDUSTRY OBSERVER

►Corbin has split the defense weapon system. In its XB-55 supersonic bomber into two development projects, with General Electric taking the advanced phase and General Electric taking the production phase. These two contractors replace General Electric which had been negotiating with Convair previously to develop the complete defense system (Aviation Week Nov. 2, p. 8).

►De Havilland has begun production tooling for the Conquest 3 and no further changes are expected in the general configuration of the latest in this jet transport series, although some design details are not yet firm. De Havilland has written an electrical equipment manual for the new Conquest 3, which is being developed by the U.S. Civil Aeronautics Administration. First Conquest 3 is expected to fly in June or July of next year.

►Portuguese planners will concentrate very far from the present state of military affairs for the NATO situation on all other fighter types with very little, if any, before money going to the fighter types. Lack of adequate air weather facilities is a serious NATO deficiency in view of the growing strength of the Russian jet bomber fleet in Eastern Europe.

►Powerplant Installation Subcommittee of the Aircraft Industries Assn. has developed detailed recommendations on all engines for helicopter engines which have been submitted to the Navy Bureau of Aeronautics for the preparation of a military specification. Oil engine manufacturers repeated with AIA in the study.

►Propeller manufacturers have won a partial victory in their fight to get specific turboprop engine types assigned to them for high-speed propeller testing in their own facilities. Plans having high priority development contracts will be furnished turboprops of the specific types scheduled to drive their propellers for in-flight test work. Low priority projects will continue to be dependent on turboprops available only at Wright Air Development Center.

►Civil Aeronautics Administration has increased Aircraft Industries Assn. considers delegation of the official showing manufacturers of small non-transport type helicopters to certify their own machines at permanent locations of the permanent field state of aircrafts rules for helicopters (Aviation Week Oct. 12, p. 11).

►Allison Aerochemical Division of General Motors Corp. reports one of its JT-17 turboprop engine (now being developed) has been tested in a Korean JT-17 was shipped from Allison in 1955 and had gone through three more field tests before being in Korea with 100 hours at the longest interval between repairs. Allison also reports that another JT-17 installed in a Lockheed T-33 has operated for 1,800 hours without repair.

►Fiat USAF brochure on the weekend of fighters in Korea shows the Lockheed F-80 Shooting Star was the jet with the most, flying 50% of the 274,776 jet fighter sorties completed during the three-year war. North American F-86 Sabres and Republic F-84 Thunderbolts each accounted for 11% of the sorties with the remaining 2% credited to Lockheed F-84 all-weather interceptors.

►Project to increase the strength of the Hawker Hunter to 50 degrees and boost power to the 14,000 hp level of the Rolls-Royce R. 14 has been studied by the British Ministry of Supply after the prototype aircraft was tested. British designers believe the new aircraft is a new version of the Vickers Supermarine Swift, also powered by an R. 14, now have won the next competitive round for Royal Air Force production orders.

►Pittsford Helicopters Corp. is considering producing its third experimental prototype YH-40 two-engine transport helicopter with Allison T56 turboprop rated at 3,750 shp. The second prototype is making completion with the Allison T56 turboprop rated at 2,750 shp in its powerplants.

Service Secretaries Speak Up

Capitol Hill elements, accustomed to seeing secretaries speaking in unison, were surprised when Assistant Air Force Secretary H. Lee White (representing Secretary Harold Talbott) and Army Secretary Robert Stevens opposed Defense Secretary Clark M. Wilson's views, and insisted on favors of military men for service chaplains. It's the first time since the enactment of the 1947 Uniformed Services Act that the Secretaries have taken issue with the Secretary of Defense—without subsequent regrets.

Wilson dismissed the Wilson-White testimony: "Well, if that's what they said, that must be their opinion. We try to let everyone see their own judgment to the maximum."

Carney Favors Nuclear Power

Chief of Naval Operations, Adm. Robert Carney, openly is challenging Secretary Wilson's decision mandating development of a nuclear powerplant for the Navy. Navy should start converting all its major ships from oil to nuclear power soon, he maintains.

Defense Budget Timing

The fiscal year 1955 defense budget is being revised to complete as it can be included in the federal budget that will go to Congress shortly after the beginning of the year. This year, the new Administration's revised budget didn't go up until May, and it was August, a month after the start of the fiscal year, before the services had their fiscal year 1955 money available.

Defense Secretary Wilson wanted to submit only a total defense appropriation estimate in January. But he was overruled by the President, so budget processing, which usually takes five or six months, is being telescoped into two and a half months.

In mid-October, National Security Council testimony on a status quo basis level of 16 air carrier groups for the Navy and boosted the USAF force level from 120 to 137 wings.

The services are due to submit their estimates to compile next fiscal year's defense composite W. J. McNell by Dec. 5.

The estimates will be reviewed jointly by the Budget Bureau and McNell's office in the following three weeks, with NSC making final decisions. Wilson predicts that the difference between service estimates and Defense Department estimates will be less than \$5 billion.

New Air Defense Study

A new air defense study has just been completed for the National Security Council by a committee headed by Lt. Gen. Harold Bell. The committee leans toward the arbitrary position that air defense should be built outward from U.S. borders. Civil Defense Administration believes the major defense effort should be devoted to early warning systems in the Arctic.

Guided Missile Evaluation

A comprehensive report on the guided missile program, due to be submitted to the Secretary of Defense Dec. 1, will make recommendations on development progress, and gaps in the program that should be filled.

It is being done by a nine-member inter-service committee headed by Trevor Gordon, special assistant to the Secretary of Air Force for research and development (Aeronautics Week Aug. 31, p. 11). The service has been going on for more than four months. Their report, which will be turned over to Assistant Secretary for Research and Development, David M. Quisenberry, and Assistant Secretary for Applications Engineering, Frank Newberry, is expected to be unanimous.

ODM: Fifth Wheel?

Office of Defense Mobilization seems to be in the actual looking in. ODM's directive on "packaging" machine tools is an early plan, where they would be used in an emergency simply transferred to Defense Department policy.

• ODM's coming directive on defense contract awards is in progress; similar ones are expected to be a reiteration of already established policy.

• Defense Department seems to be taking seriously ODM's main task of drawing up an all-out mobilization plan. ODM has asked Defense to submit the full mobilization requirements of thousands of military and items by Nov. 15. Asked about this, Secretary Wilson said he was anxious to do it, and added, "I suppose it is a serious mobilization study."

Rail Target: Bonanza

Reduced materials are single out Bonanza Air Lines for attack in their campaign against subsidies. One rail spokesman said "The 'bar and reasonable' and compensation rate for Bonanza, which certificate is now up for renewal, was first estimated by CAB at \$975,500 for the current year. Of the total, \$46,000 is talked service road pay. The remaining \$929,500, representing more than 95% of the total, consists of subsidy."

Hoover's Error?

Civil Aeronautics Board members are united in freer President Herbert Hoover's assuming for abolishing independent agencies. Hoover said that they are 74 or 80 independent agencies and that if the President desired one less a week to each it would take up to 70 to 80 hours a week. The points are made that there are only about 12 significant independent agencies and that the President is not prepared to relinquish the activities of the quasi-independent regulatory agencies, the exception being CAB international cases.

More Defense Secretaries?

Outlook is that the Pentagon's corps of secretary-level officials, which now totals 25, will keep growing.

• Secretary Wilson has indicated he will ask Congress for legislation authorizing another assistant secretary to handle foreign policy for each of the services.

• The present total of 25 doesn't give a complete picture "Special assistants" and "members to the secretary," who report to the Secretary and have approximately the status of assistant secretaries, have been appointed—and more probably will be.

For example, on Defense Department's organization chart, the Assistant to the Secretary for Atomic Research has equal status with the assistant secretaries.

—Katherine Johnson

AVIATION WEEK

Air Policy Study Sidesteps Military Issues

VOL. 39, NO. 20

NOVEMBER 16, 1953

• First review since 1948 centers on civil aviation; some critics see little prospect of concrete results.

• Aircraft industry forecasts major airpower crisis will result from lack of adequate planning for services.

By Robert Hite

First step since 1948 to formulate a national air policy got under way last week in Washington.

An Air Coordinating Committee appointed a special liaison group to draft the policy study and released a proposed agenda that outlined Aviation Week's main prediction (Oct. 5, p. 17) that the entire effort would be concentrated on the civil aspects of aviation without an attempt to deal with the hot political core of adequate military airpower.

Members of the ACC special liaison group:

- Charles G. Cary, executive secretary, ACC.
- Budley Nash, USAF.
- J. T. Fike, Navy.
- James H. Davis, Army.
- Paul Pennington, State Department.
- Frank H. Lee, Commerce Department.
- Ernest Kinsley, Civil Aeronautics Board.
- Dr. H. Alkott, National Advisory Commission for Aeronautics.
- Earl Wadsworth, Post Office Department.

Representatives for the Treasury Department has not yet been named. This group has asked the aircraft industry, airlines and other interested parties to submit their written comments on both the proposed scope of the study and on their position regarding any specific items on the agenda. There will be no public hearings.

All industry comment must be submitted in writing to Charles Cary. ACC plans to have no special staff for the study. It will depend on the special liaison group whose members all have other full-time government jobs. Earlier indications that the study might be completed by early next year have faded and a target date of late next spring or early summer seems more likely.

Industry differences—industry criticism to the ACC agenda was also activated by general indifference, based on the feeling that this is just another of the many "study studies" which the Eisenhower Administration has been

conducting for legislative action and there is little prospect of any concrete results from the survey.

There also is some feeling that the ACC study is narrowing its scope to civil aviation, but gone any study of the original intent of President Eisenhower's letter which specified a "comprehensive review of our aviation policy." These critics of the ACC study complain that no sound civil aviation policy can be formulated without an adequate foundation of military airpower and that until the growing problems of military airpower are tackled by the Republican Administration any study of civil aviation is doomed to failure.

Criticisms—industry observers report growing concern among several defense officials and aircraft manufacturers over the lack of planning and policy for future development, maintenance and employment of adequate military airpower. It is no secret in the Pentagon or in the aviation industry that if present policies are continued, a major crisis will confront the entire military in 1975 and 1980.

There is a strong feeling in certain military and aviation circles that a new military airpower policy must be developed by the Republican Administration and presented to the next session of Congress for legislative approval if the crisis now faces is to be avoided.

A spokesman for the Aircraft Industries Assn. admitted that aircraft designers would be required this year to fend off the impending crisis, but admitted that AIA was not certain if "the time were ripe" for a public battle on the issue for a full-scale development of an adequate military airpower policy.

Policy Abandoned—Pentagon observers explained that many of the military mobilization and procurement policies of the previous Administration have been abandoned without any new program to take their place. Full effect of the \$4-billion cut in the fiscal year 1954 current procurement budget will be felt by the industry in 1956.

Both Pentagon and industry observers agreed that the Air Coordinating Committee probably was not the best agency to tackle a full-scale military airpower study. Concern was that either the National Security Council or a separate commission of top flight officials, similar to the Feltstein Commission, should assume this task.

Following is the proposed agenda for the ACC policy study:

- Air Transport.
- Airline subsidies. Direct federal aid is relationship to military's present stage of development and the overall fiscal policies of the Eisenhower Administration.
- Role of U. S. air transportation system.
- Nonmilitary airline operations.
- Policies and standards to be utilized in establishing air route patterns.
- Movement of mail by air.
- Air cargo operations and development.
- Federal government use of U. S. military and commercial air transportation.
- Air transport mobilization planning.
- Airports.
- Federal and airport grants. Continued development of existing programs.
- Review of primary recommendations of the President's Airport Commission (Doolittle Report).
- Civil aviation's use of airports.
- Airports in foreign territory. Right of U. S. aircraft to use such airports.
- Airways.
- User charges policy with respect to nonmilitary facilities and services.
- Development and implementation of overseas air-traffic control system of airway facilities and services.
- Review of domestic aviation system in terms of diversity of responsibility among federal government, local governments and industry.
- Aeronautical communications.
- International Aviation.
- Presence of aid in air transportation.
- International exchange of air transportation.
- Establishment of air lines and rates in international air transportation.
- U. S. legislation.
- U. S. government relationship to the International Air Transport Assn.
- International Civil Aviation Organization. The role of ICAO in international civil aviation.
- U. S. participation in ICAO.
- Facilitation of international civil aviation. Simplification of entry and

ent appointments pertaining to international flights.

- Economic and technical assistance. Action in the multilateral (CANAD) and bilateral fields.
- Aircraft and Equipment Manufacture and Sale.

• Role of federal government in development of new transport aircraft.

- Sale of U. S. surplus and aerospace equipment abroad.
- Sale of foreign aircraft and aerospace equipment in the U. S.

• Aviation Safety.

• Federal government's role in the field of aviation safety.

• Control and coordination of search and rescue.

• General Aviation.

• Personal aircraft. Development of aircraft possessing increased safety and operating economy.

• Airman training. The federal government's role in training flight and technical ground personnel.

• Aviation education and information. The federal role in these areas.

• Federal-State-Local Relationships.

• State activities in the aerospace field. Coordination by states of aviation safety activities, reinforcement by states of federal government safety regulations.

• Economic regulation of air transportation. Federal-state relationships in this field.

• Multiple state treaties of aviation cooperation.

• Exercise of control over airspace as among the federal, state and local governments and private interests.

• Research and Development.

• Aeronautical research and development programs in the field of civil aviation.

Airway Cuts

• CAA trim operations, continues staff layoffs.

• Airline telephone cost is shifted to carriers.

Civil Aeronautics Administration is cutting several facilities, shifting some cost of services to airlines and cutting new hires in personnel.

The new cuts linked out last week dropped a news blackout down by CAA Administrator Fred B. Lee several his company program.

In addition to shifts recently reported in *Airways Week* (Aug. 15, p. 51, Sept. 28, p. 50, Nov. 30, p. 7), the reductions include:

• Shutdown of approximately half of the advisory procedures on state and national aids, saving an estimated \$100,000 a year. CAA has proposed a current priority but on these facilities for use of regional administration in determining which local aviation projects should be funded.

• Aeronautics telephone lines in Air Traffic Control networks are now to be paid for by the airlines. CAA has advised Air Transport Association. Some estimate of about \$140,000 a year. Other similar transfers are in preparation. Several officials revealed to *Airways Week*.

The transfer of completely private services are in addition to CAA's new policy to "charge" for its overall public service.

• Low-priority major and commercial aviation projects are under review by regional administrators, who will propose

regional administrators, who will propose cuts in the regional "just-in-time" committee of Air Coordinating Committee.

• CAA photographic lab shutdown in the latest round-out. The 10-man staff has received notice of imminent termination in Oct. 1962. The Wash. office, which did photographic work for aviation safety and airports research, CAA accident investigations, and other aviation photographic services.

• CAA Personnel Laboratory—Transfer "indefinite in form" are employee, some jobs of CAA headquarters in Washington as well as field offices. Assistant Administrator S. A. Kemp says that CAA employment dropped from 15,572 in July 1, 1962, to about 14,000 on July 1, 1963, and the staff has dropped further this summer and fall. Entire of further reductions is likely by Christmas depends on accounts being made last week. He said.

To offset the loss, CAA recently issued a freeze on filling vacancies resulting from resignations. Hiring to fill are vacancy requires the approval of either the administrator at his center.

Two other anticipated resignations in excess of the average annual CAA turnover of 3% (between 6 to 7%, smaller offices 2 to 3%). But some secondary reductions are in force elsewhere. In Washington, Kemp cites reduction of the office of Aviation Defense Requirements from 77 to 11 last February and recently to five.

• Positive CAA Programs—Despite the service surrounding Law's program, *Airways Week* finds a number of positive policies and programs under way this month.

• Operation of any facility that local authorities are willing to pay for. Federal Aeronautics Director J. M. Beardsley points out that the facilities are accepted as planned are federal liability reductions. CAA is anxious to provide local facilities where the local users are willing to pay their own way. Lee stressed this offer in a speech delivered last week to the Greater Miami-Airline Association.

• Cooperation with industry in taking over any job formerly operated by CAA. The active adjustment program is not in federal budget now, but CAA reportedly will help industry in its attempts to reduce aircraft noise comparable to local communities.

Administrators Lee and with announced CAA's Regulatory policies (back in Commerce Undersecretary Robert Murray previously had done).

The federal government cannot play the Great White Father to all applicants of civil aviation in all communities for all time. . . . Unfortunately, as we yet has discovered a way of saving money in general without saving it in particular.

Two must come up, therefore, to preserve every service which might be desirable. While you do have a right to expect it that CAA will perform every service which is essential, in terms of our responsibility for public safety.

GM Buys Kaiser's Willow Run Factory

Kaiser Motors Corp. last week said it has bought Willow Run, Mich., plant to General Motors Corp., the lowest bidder, for \$28 million. Entire proceeds of the sale will go to pay a major part of Kaiser's remaining indebtedness to the government.

After a 500-million fire destroyed in Livonia, Mich., Hydrocarbon transmission plant last August, General Motors bought 1.5 million sq. ft. of factory space at Willow Run. Requests to lease 50,000 additional sq. ft. of space this month set off rumors that a sale was imminent.

• General Fish-Whitmore, Edgar F. Kaiser, president of Kaiser Motors, called for bids some weeks ago on a top level, highly secret basis. GM won the bid and probably will take over the Willow Run plant within the next 12 months.

The 4,600,000 sq. ft. Willow Run plant, largely in the world for one-time use, was built during World War II. Ford Motor Co. assembled B-24 Liberator bombers in the plant and Kaiser-Frazer Corp. issued it in 1945 (see *Automotive News*).

Kaiser bought the plant three years later for \$15.5 million and produced both cars and Packard C-119 pocket Air transport there. The company had retired membership of a second Class C-121B, issued (transport before the 1955 Ford).

Ford canceled the C-119 and C-121B contracts last June 28, p. 16.

Kaiser will move its main assembly, stamping and related operations next year from Willow Run to its Toledo, Ohio, plant where it has more than 5,000,000 sq. ft. of manufacturing area available.

• Ken Redwood—With the sale program plan an additional \$511,000, Kaiser will reduce its government loans to \$15,641,000. At the time the firm owed the government \$74,700,563, borrowed for automobile production. The priority debt of this remaining amount, the company said, has been shortened from 1965 to 1970.

General Motors presently has 7,000 employees at work in its leased space at Willow Run. This company, recently moved out its first of the two-body transmission, 12 weeks after the Livonia fire.



Roy Carl Henshaw

Hinshaw to Receive 1953 Wright Award

Rep. Carl Hinshaw (R-Calif.) has been designated by the National Aeronautics Association to receive the 1953 Wright Brothers Memorial Trophy, for "leadership in the aviation industry."

Hinshaw has been president in support of aviation during his 13 years in Congress, serving as numerous committees, the Congressional Air Policy Board and as advisor to the U. S. delegation to the International Civil Aviation Organization. He is a member of the Society of Automotive Engineers and Institute of the Aeronautical Sciences.

The trophy, a 12-in. cup replica of the historical Wright airplane, will be presented personally to Rep. Hinshaw by President Eisenhower at the Aero Club of America's 1953 Wright Memorial Day dinner at the Hotel Statler, Washington, D. C., Dec. 37.

Dr. Leslie A. Ryan, director of the Institute of Aeronautics, University of Illinois, has been awarded the 1953 Ford C. Ramsey Trophy by NAA for outstanding contributions to the development of aviation education in the U. S. since 1924. Ryan also will receive his award from President of the Wright Society.

115 USAF Wings By Mid-54: Wilson

Air Force will have "at least 115 well equipped wings" by June 30, 1954, Deane Secretary Charles E. Wilson said last week. It is an example, he said, of the Air Force "getting its house in order."

"They thought they could only get 100 good wings by that date," he said, "and I thought they could get 114."

They have done a lot of things in the Air Force to improve and better their progress. When they asked us, they didn't want it; they knew they had to fix it and promptly took the necessary action.

Wilson stressed his hope that "one hundred thousand effort is at our next peak." Military tests are still substantially the same as they were nine months ago, he said, but a reduction of supporting personnel is expected to be achieved shortly.

Stroukoff Negotiates For Chase Contract

Stroukoff Aircraft Corp., West Trenton, N. J., is negotiating with Air Force to obtain a research and development contract formerly held by Chase Aircraft Co. for a semi-boosted transport.

The USAF awarded the G-121B to Stroukoff Aircraft Corp. for a semi-boosted transport. The contract was held in abeyance since the split of Chase (see *Airways Week*, Sept. 14, p. 14).

Stroukoff, the Chase Aircraft Corp., several Chase company.

Canada Strikes Back At CAB Restriction

Toronto-Canada Air Transport Board has ordered Canadian Airlines and Pan American World Airways to show cause by Dec. 15 why they should be permitted to continue using the same aircraft for serving Canadian points as are used on foreign flights.

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FORRESTAL'S GANTED DICK TO SAVE \$3 MILLION

Redesign of the flight deck on the Navy's new carrier would cost \$36 million, according to an \$8 million configuration is expected to cost \$8 million in cost of building the ship. Aerial's conception of the carrier shows

gress planned for both USAF and Navy aircraft and the additional point of commercial jet transport applications.

Currently the J37 is considered to power the Boeing B-57 and British Aerospace, the Boeing project 707 commercial jet transport and several other North American F-100 Super Sabre day fighters. General Electric's F-102 all-weather interceptor, McDonnell F-3H Voodoo long-range night fighter, Douglas F-4D Phantom all-weather interceptor, and Douglas A-1C Corsair biplane jet bomber.

For fighter considerations, the J37 is equipped with an afterburner that boosts its total thrust to just under 15,000 lb. for short intervals. PWMA says the J37 has been as productive at its East Hartford plant since last February. The Ford aircraft engine plant in Chicago also is working for production of the J37 under a PWMA license and the Navy is considering establishing a third source of production as one of its new government-owned plants originally scheduled to build other engine types.

Split Components—The J37 features a split-component design that was previously by PWMA and now has been utilized by Bristol in England and Curtiss-Wright Corp. in the U.S.

The split-component design provides fuel injectors, high compression ratio, low specific fuel consumption and greater operational flexibility. PWMA also is applying its split-component design to advanced developments in turbo-prop.

The J37 is the first turbine to be designed and developed by the PWMA engineering staff headed by Wright Patton, engineering manager, Pratt & Whitney engine, and W. D. Goss, a senior development engineer.



ARGENTINA TESTS "MULTI-PURPOSE PLANE"

Designed for training and light tactical missions, this new L-39, built by the Lockheed Aircraft Corp., Argentina, is undergoing flight tests. Gross weight of the two-seater all-weather plane is 12,510 lb. Top

Speed Records

North American Aviation has not given up its attempt to set a new 54-in. speed record with the F-100. As soon as desert temperatures are high enough, another effort will be made to top the Douglas F-4D record by the expected 150.

Meanwhile, Douglas may go after the 13 km. speed record claimed by NAA for the F-100. This time, Douglas would use the D-558-II Skyrocket. Douglas believes the Skyrocket has the necessary initial fuel capacity to cover the 13 km. course twice at a speed above 500 mph.

CAB Orders Nonsked To Change Name

North American Airlines must omit the word "American" from its name to prevent unfair competition with American Airlines, Civil Aeronautics Board has ruled.

The Board concluded "That American Airlines was incorporated under that name before North American adopted the name, and, as changed its corporate name to, North American Airlines; that the term 'American' had acquired a secondary meaning before North American adopted that trademark; and as changed its corporate name and such secondary name continues to exist." The Board added that North American's use of "any combination of the word 'American' constitutes an unfair and deceptive practice and an unfair method of competition.

Deacons' Criticism—The decision evoked criticism from the Senate Small Business Committee. The committee's official weekly staff report called the action "prevention of independent action" and added:

"It is significant that the Board has never promulgated a similar order against other Pan American World Airways or the former All American Airways."

North American is the largest domestic scheduled airline and competes directly with American Airlines in transportation markets.

CAB member Joseph Adams dissented from the decision, strongly opposing. He said: "I don't find either the office of enforcement nor the Interstate Commerce Commission nor the Federal Reserve Board of proving the existence of unfair competition about in any way, although some public confusion has been demonstrated. I do not see that it is substantial, or more than 'inconsequential.' Adams called court orders that public confusion must be substantial or actionable, rather than restricted to a relatively few unbalanced customers.

Protests, Little-Washington attorneys expect North American is seeking reconsideration and filing that to seek federal review at the end of the court's month's appeal. The CAB decision, North American may adopt a version of the "air bus" name that it recently registered.

New Firm to Build Spray/Dust Planes

North American Central-Lennon Corp. plans to produce 12 air tractor spray/dust planes by May of next year in its Yakima, Wash., plant. The company says an additional 50 air tractors will be turned out by February 1955.

Prototype of the new air tractor was built by Central Aircraft Inc., Yakima, (Aircraft Week Aug. 17, p. 426), with engineering handled by Lennon Aircraft Co., Seattle. The specially designed agricultural machine, powered by a 450-hp Ford & Whitney Aircraft Wasp Jr., features a working dust capacity of more than 2,000 lb. or 500 gal. of spray and has interchangeable wing and tail sections.

President of Central-Lennon is Robert Lennon.

Hydraulic Conference

One hundred hydraulic experts representing U.S. and foreign airlines attended the third annual Transport Aircraft Hydraulic Conference at Detroit Nov. 1-4. Detailed comments at the Volvo-sponsored meeting will appear in an early issue of AVIATION WEEK.

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new motor for small fans, blowers, pumps

light • 2 1/2 ounces

rugged • 2000 hours brush life, minimum

small • 6 inches long, 2 1/2 inches in diameter

performance data

actual size

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- Dimensions 6 inches long, 2 1/2 inches diameter
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peoples, which is not even of our world today are the great exchange for some evidence.

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a perpetuated solely from the will of the people... are these simple habits... and a

freedom under philosophy of a free and independent land... just around the corner.

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Consider it the vital measure of a nation's strength and stability... and as with the state, so it is with those who contribute to its maintenance and policy... By 1977 American industry had begun to face the pressure of its ultimate status in defense, transportation and business utility... In Air Associates, specialist of research and development manufacturing and marketing, our founding is answer to those needs... Today the character of our organization is the continuing force which makes available the finest aviation products the world has ever known.

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'Dollar Barrier' Holds Pacific Air Tourists

An interest level from the Far East to the United States is held to a minimum by a scarcity of dollars in the sterling block nations, says Sir Lewis and Lord, Air Vice Marshal of New Zealand and a member of the executive committee of the Pacific Air Travel Association, a group formed to foster travel in the Pacific area.

"Until the dollar barrier is overcome we can't anticipate any flow of holiday visitors to the U.S.," declares Sir Lewis. The less of currencies than the Far East is convertible, he believes, citing as an example that one out of every 150 New Zealand citizens visited England last year.

► **Barriers in Payment**—A New Zealander going to the U.S. can buy his ticket in pounds but must obtain dollars for expenses. The tourist in pounds he is allowed to exchange for dollars depends on the importance of the trip (he would be allowed more for a business journey than for a pleasure jaunt) and on the current dollar balance enjoyed by the country.

The Pacific Air Travel Association is formed by its 74 active members, such as governments, which pay a \$600 fee

and Allied members, which include travel agents, hotel associations, airlines and shipping companies. It is now for 1978.

Air National Guard Gets First F-86s

First deliveries of North American F-86 Sabers jet fighters, purchased by Lt. Gen. Orel Cook, USAF, deputy chief of staff for national Airpower, Westinghouse, 2, p. 15), have been made to two Air National Guard fighter squadrons of ANG's "Northwest" wing headquartered at Spokane, Wash.

► **Saber Units**—The units are the 188th F-1 Squadron, Great Falls, Mont., and the 166th of Boise, Idaho. In the next few months other units, the 166th F-1 Squadron, Spokane and the 121st, Portland, Ore., the 156th, Medford, Wash., and the 154th, Missoula, Wash., will get their Sabers.

By the end of June 1975, 67% of the 22-wing Air Guard will have first line aircraft (Airman West Oct. 21, p. 9). At the end of 1973, every available adequate resources and facilities will be at the ANG officials say. During this fiscal year, \$25 million is scheduled to be spent on jet facilities.



INTERNATIONAL INTEREST IN UAL 'DOCK'

Increasing interest from a number of international airlines has been viewing a model of a proposed air dock developed by United Air Lines for the spending handling of passengers and cargo. They are viewing the 32 engineering personnel who flew to UAL's Denver, Colo., headquarters last after the annual meeting of the International Air Transport Association in Montreal last month. Left to right are: Mr. M. Bickel, senior vice president, International Airlines System, Oakbrook, Ill.; an English, general manager,

Aerolineas Argentinas; J. D. Cradock, UAL engineer and air dock designer; N. D. Barabak, UAL director of design build and airports; S. J. Ables, president, Aero OTC, Frankfurt, Germany; English, president, Air France; Dr. Walter Schindler, president, Swissair; S. J. Shumaker, chief engineer, British European Airways Corp.; Raymond Dyer, vice president, Air France; O. D. Johnson, general manager, Icelandic Airlines; Gen. Louis Galle, director general, Swiss Airline.

AVICA FEATHERWEIGHT STAINLESS STEEL TUBE ASSEMBLIES for SYNTHETIC OIL LINES



- MECHANICALLY ATTACHED ALUMINUM FITTINGS
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The AVICA combination of aluminum fittings with stainless steel flexible tubing, resistant to oil synthetic oils used in aircraft systems, offers a large weight reduction over an all stainless steel unit, without performance loss.

NO WELDING OR BRAZING
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SAVE WEIGHT AND INCREASE PERFORMANCE on synthetic oil lines.

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A precision gear head combined with a maintenance free motor gives you the answer to high torque at low speed. The motor can be 50 cycle, 180 cycle or variable frequency—in single, two or three phase—with air-cooled or self-cooled frame types. The gear head is arranged to provide the output speed you require, with standard housing sizes of 50, 100 or 200 in. 3000 is possible. High output torques, to drive, actuate or control, in confined areas, make this line of tiny gear motors ideal for a wide variety of applications on the ground and in the air.



SPECIFICATIONS FOR MODEL GUNPP-1 400 Cycle Capacitor Run Induction Motor

115 Volts • 400 Cycles • 1 Phase • 8.5 Amps
Full Load Torque 100 Oz. In.
Starting Torque 300 Oz. In.
Gear head 1/2" output gear and 1/8" B&B
33 P.P.M. • 304 to 1 Gear Ratio • Reverse Rotation
Interchangeable Duty • 10 Minutes on, 10 Minutes off
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C&A, Oct. 31 for the Far East

► Lots of *Hobas-Air* Poles has 60 days to 53, its answer until the coast through the Justice Department.
USAF attorneys have indicated that C&A's complaint has no chance in court since the law is clearly not of increasing a lease. No restraining order is needed, therefore, the Air Force cannot be enjoined from giving ahead and "accepting" its lease assets.

However, Air Force officials say the release will have a "reasonable" period to return the assets of the new \$12,300 lease is not signed.

Signing of new lease for USAF's second C-14 is the result of months of study by Air Force attorneys who have been tightening the lease agreements. One attorney and the lease had "lots of holes." And as a result of the study USAF has been able to increase its assets.

ATA Stresses Quality Control, Management

Improved management methods and quality control were discussed by some 100 airline executives attending the Air Transport Association's annual symposium and engineering conference at Miami Beach, Fla.

Discussions at the closed meetings of the conference centered on two major aspects of management methods, according to Milton Arnold, ATA vice president operations and engineering.

- Personnel utilization, improvement and reorganization.
 - Stock control, or reduction materials inventory with maximum inventory.
- Statistical quality control received special emphasis, reports ATA engineering director Allen Dulles. He says this

ATA Agenda

Special engineering and maintenance meetings of Air Transport Association with manufacturers are scheduled by ATA for the period before the next annual conference.

- United Aircraft Corp., Dec. 1-3 Host with United Air Lines.
- Wright Aeronautical, January, Problem Air Lines.
- Consolidated Vultee Aircraft Co., February, Swift Airways.
- Lockheed Aircraft Corp., April, Capital Airlines.
- Douglas Aircraft Co., May, National Airlines.
- Boeing, September, Pacific Northwest Airlines.
- Boeing, September, September, Pacific Northwest Airlines.
- Boeing, September, September, Pacific Northwest Airlines.
- Boeing, September, September, Pacific Northwest Airlines.

Travel at its Best...

Douglas does it again!

We congratulate **DOUGLAS** Aircraft Company, Inc. for their production of the DC-7. America's newest commercial transport.

VOI-SHAN Manufacturing Company, Inc., having supplied many standard and special design fasteners used in the production of the complete Douglas DC series, is proud to share in this achievement.



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AERONAUTICAL ENGINEERING



COMET MOVES ACROSS sky, showing characteristic low-disked wing. White-topped cabin is trimmed with blue markings.



COMET STANDS ON THE AIRCRAFT at La Moutte Airport; this is the base for Air France's new fleet of jet transports.

First-year Report on . . .

How Air France Comet Training Works

By David A. Anderson

Facts: The integration of turbojet and turbo-prop transport operations with those of a piston-engine fleet is now being completed by Air France, operator of the world's largest airline route and proud owner of de Havilland Comets and Vickers Viscounts.

With three Comet IDe now in service from Paris to Beirut, Casablanca, Algiers, and the more number of Viscounts on Continental routes, the French airline has progressed from first-hand experience to airline operations in less than one year.

The extent of their Comet program for operations and maintenance, at the end of the first year, was told exclusively to Aviation Week recently at the Paris headquarters of the airline and at Le Bourget Airport, its Comet base.

► Fleet Size: Air France purchased three Comet IDe (44-passenger capacity) and has an option on three Comet IDe (44-passenger 44-seater) aircraft for delivery in 1954.

Six Viscounts will be delivered before the end of this year, and six more will follow next year. At the time of Aviation Week's recent visit to Vickers' Weybridge plant, the sixth Viscount was making completion on the production line.

The company that Air France is naming now is to buy certain operational experience with the new planes. While the planes are making two at three per week on the trial routes, additional routes are being added in the light of continuing success as experienced for future applications of the turbine transports.

Cooperative exchange of information with British Overseas Airways Corp on Comet experience has helped both carriers to prepare day-to-day operation and future planning.

► Operations: Marcel Faure, assistant head of operations, said that a special group had been set up to survey the topography of runways on the routes that Air France would be flying with Comets. The information the group collected on runway characteristics, clear approaches, runway slopes, crosswind frequencies and directions, and the like was analyzed and incorporated into a data handbook for the training of the crews.

Further information had been obtained from BOAC on runways, and in turn, Air France had loaned over its runway data to the British carrier.

Given control had been in the air

Air France Training Program For Comet Pilots

► Period 1/A:

- A) General instruction, including:
 - 1) Preflight inspection and check list
 - 2) Location and use of safety equipment
 - 3) Internal and external equipment
 - 4) Familiarization with equipment location
 - 5) Starting the engines

► Period 1/B:

- B) Familiarization with the radio
 - 1) Taxiing, including use of brakes and wheel-brake steering. Checklist before takeoff
 - 2) Takeoff and landing
 - 3) Work in the air
 - 1) Approaches at reduced speed, in straight lines and turns, at weight above the maximum landing weight

► Period 2:

- A) The same, with detailed engine
 - 1) Fuel flaps, landing gear down, thrustful engine
 - 2) Fuel flaps, landing gear extended, thrustful engine
 - 3) Fuel flaps, landing gear down, 30-deg. turn in cruise condition

► Period 3:

- 1) Climb to 10,000-40,000 ft., maintaining correct indicated air speed, and use of the Machmeter
- 2) Climbing turn
- 3) Level flight and turns at altitude
- 4) Compensation in climbing
- 5) Emergency operations of hydraulic systems in case of failure

- 6) Use of automatic pilot and fuel switches
- 7) Use of pilot's radio
- 8) Use of fuel controls
- 9) Use of automatic turn
- 10) Effects of compressibility at 800 ft. Mach above 15,000 ft.
- 11) Use of altimeter at high Mach numbers
- 12) Normal descent at 220 knots
- 13) Turns at 220
- 14) Normal descent with no limits
- 15) Emergency descent at 250 knots

► Period 4:

- 1) Effects of turbulence with 15-deg flap deflection
- 2) Aerobically flight in turns with two and three engines
- 3) Fuel shutoff on four engines
- 4) Fuel shutoff on four engines operating
- 5) Engine failure on takeoff
- 6) Fuel shutoff on three engines
- 7) Failure of two engines on takeoff
- 8) Landing on two engines
- 9) Landing without flap
- 10) Reclimbing engines in flight
- 11) Reclimbing engines in flight
- 12) Fuel shutoff on four engines
- 13) Landing on four engines
- 14) Fuel shutoff on four engines
- 15) Landing on three engines
- 16) Landing on two engines
- 17) Failure of two engines on takeoff
- 18) Landing on two engines
- 19) Fuel shutoff on four engines
- 20) Landing on four engines
- 21) Fuel shutoff on four engines
- 22) Landing on three engines
- 23) Landing on two engines
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- 99) Landing on two engines
- 100) Landing on four engines

► Period 5:

- 1) Taxiing, including use of brakes and wheel-brake steering. Checklist before takeoff
- 2) Takeoff and landing
- 3) Work in the air
 - 1) Approaches at reduced speed, in straight lines and turns, at weight above the maximum landing weight

► Period 6:

- 1) Taxiing, including use of brakes and wheel-brake steering. Checklist before takeoff
- 2) Takeoff and landing
- 3) Work in the air
 - 1) Approaches at reduced speed, in straight lines and turns, at weight above the maximum landing weight

► Period 7:

- 1) Taxiing, including use of brakes and wheel-brake steering. Checklist before takeoff
- 2) Takeoff and landing
- 3) Work in the air
 - 1) Approaches at reduced speed, in straight lines and turns, at weight above the maximum landing weight

- 4) Taxiing, including use of brakes and wheel-brake steering. Checklist before takeoff
- 5) Takeoff and landing
- 6) Work in the air
 - 1) Approaches at reduced speed, in straight lines and turns, at weight above the maximum landing weight

► Period 8:

- 1) Taxiing, including use of brakes and wheel-brake steering. Checklist before takeoff
- 2) Takeoff and landing
- 3) Work in the air
 - 1) Approaches at reduced speed, in straight lines and turns, at weight above the maximum landing weight

► Period 9:

- 1) Taxiing, including use of brakes and wheel-brake steering. Checklist before takeoff
- 2) Takeoff and landing
- 3) Work in the air
 - 1) Approaches at reduced speed, in straight lines and turns, at weight above the maximum landing weight

► Period 10:

- 1) Taxiing, including use of brakes and wheel-brake steering. Checklist before takeoff
- 2) Takeoff and landing
- 3) Work in the air
 - 1) Approaches at reduced speed, in straight lines and turns, at weight above the maximum landing weight

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WOMI TALL OF G-E's for long jet service organization is a General Electric's Possible plan now follows, with each one of 65 key operational centers complete a service network that brings G-E engineering within easy reach of G-E jet engine users.

How General Electric maintains peak turbojet



USAF REPRESENTATIVES co-ordinate with G-E technical representatives in seeking new ways to improve performance of G-E turbojets.



USAF OVERSAIL, RANDI locale special engineering assistance from G-E district personnel. Each district covers assigned areas in G-E.



G-E SERVICE GROUPS of Los Angeles and Boulder Field, Kansas, modify G-E jet engines under their plans in the United States.



AFWAL AIRMAN (CIVILIAN) personnel are instructed by G-E field staff at maintenance and operation of G-E jet engines.

performance in the U. S.

Coast-to-coast Service Brings G-E Jet Engineering Into Field At 65 Key Locations

Highly trained G-E "trouble-shooters" provide engineering assistance at USAF bases, airframe manufacturers' plants, USAF overhaul bases, G-E service shops and special experimental test locations. Not only do these technical representatives assist in the solution of engineering problems in the field, they do much to help improve jet engines still in the factory. Coast-to-coast coverage throughout the entire world, G-E jet engines are insured top performance at all times. In Korea, England, Germany, Puerto Rico, Alaska, Greenland, Iceland, France, as well as the United States, G-E's jet service engineering organizations are on the spot to make sure G-E turbojets are performing properly. In the United States alone, 65 key locations are brought within easy reach of G-E engineering by a nationwide service network.

In addition to instructing USAF and airframe manufacturers' personnel on maintenance and parts ordering, test type subject technical reports on in-service jet engines to delivery engineers. These reports are carefully studied by development engineers and often result in design changes. Many of the improvements in the jet can be attributed to observations of G-E technical representatives in the field.

Following through on jet engines after they leave the plant means that no matter where a G-E jet engine goes, General Electric engineering goes with it. This is added insurance to users of G-E turbojets of optimum performance throughout the life of the engine. — 104



SPECIAL TEST LOCATIONS provide means for G-E test rigs in varied angles and locations under service conditions.

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DOUBLE-BARRELED exhaust pipes of Ghost turbojets in Comet museum level awaiting for next takeoff and test, now abandoned by manufacturers and user alike. While park on open surface a lifetime of life not built in. Only, but completion is some months away.

Maintenance of the Comet, and its engines, has not required any special tools or special problems. He added that for that reason, the Comet hangs like just like any other maintenance hangar.

There were two interesting sidelights in the shop. The first was that there seemed to be no lack of accessibility to the engine compartment with its "beard". Ghost engines, although this is a favorite argument of the jet proponents. With the plane in a static position, it was possible to reach the lower portions of the engine. A low seat would have made accessibility easy up to the engine compartment.

The second sidelight: All attended meetings on the Comet were in English, on the Air France Lockheed Super Constellation, all such meetings are in French.

Engine maintenance is routine; overhead is currently done at the 450 lb. mark, and is to be extended soon to the 600 lb. level. Current practice is to send engines back to the D61 factory for overhaul. In the near future, overhaul of the Comet engines will take place at Air France's engine shops at Courbevoie near Paris.

Flight Training—Comet crews began their training in December 1952 with a program about three times as involved

as that required to train a Comet or DC-1 pilot for operations.

Two crews had made final certification trips over BOAC routes with the British airline, and had secured instruction in England. Part of their program was a complete seven-week ground school course at the de Havilland factory, and two months of flight training under the tutelage of D61 pilots. Mountain radio operation and navigation were going through the BOAC ground school.

After the first two crews had been through the "British" phases of their program, they returned to start off the other crews in a comprehensive program of their own.

The training included about 18 to 12 hours of local flights, during which the pilots got the feel of the airplane under various conditions of aerodynamic configuration and power. After this, they fly the Comets over ocean routes for night flying, in cruise and approach procedures, use of radio and instrument aids, and integrated crew work.

Handling Characteristics—According to Capt. Andre Goussard and Steve Fawcett, chief and assistant chief pilots for Air France's Comet unit, the Comet has no vicious characteristics at all. There is plenty of stall warning before the airplane drops out into a profile, easily controlled stall with no tendency to roll off on a wing.

The airplane has a tendency to pitch



Here is a record of performance no other type of parachute has ever delivered.

An ejector seat with a 400 pound load equipped with a Pioneer P-7B parachute was catapulted from a jet plane flying at a speed of 400 miles per hour at a 200 feet altitude. The parachute was fully opened and in normal rate of descent 150 feet above the ground.

This is but one of hundreds of tests, under the most difficult circumstances, which have proved the performance superiority of the new PIONEER GUIDE SURFACE PERSONNEL PARACHUTES.

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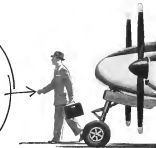


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up near its critical Mach number, and the pilots fly closely enough to that value during one phase of their training to appreciate the accurate Mach numbers of 0.77 in climb, and 0.81 in descent flows during the program.

• **Criticism**—Critics of the Coast-to-Go jet transports in general have cited three specific complaints:

• **Takeoff** procedure becomes a critical problem too early.

• **Landing** in a wet or icy runway could be difficult because of the lack of reverse thrust.

• **There is a lack of "feel"** transmitted to the pilot through the control columns during flight in turbulent air.

• **Accidents**—Chrysler and Lockheed gave their answers to the three items.

• **Part of the training program** for Coast jets—British and French—includes simulated "critical" takeoffs to initiate the pilots. Air France training also includes a stalled takeoff. The airplane is pulled to a stalled attitude as soon as possible during the takeoff run. This is held only long enough to stabilize the aircraft and to prove to the new pilot that the plane won't take off under such a condition.

Chrysler stated that it takes a lot of strength to hold the stick all the way back and hold it back during a takeoff. This "stall-warning" characteristic was an excellent reminder, he believed.

In addition to this training procedure, takeoff calculations have been made for every runway on the Coast route for all conceivable conditions of wind, weather and weight. These calculations have been worked into chart form and



NOZZLE CHECKER

Designed to measure nozzle spray direction in jet and diesel engines, this portable device operates by dividing and measuring segments of spray into gas columns for dispersion and observation checks. Nozzle is placed in glass cup at top and attached to flow source. Called for Patent, unit is manufactured by Jeffert, Inc., Englewood, N. J.

Lockheed Neptune Gets New

Temperature Warning System



Newest version of the U. S. Navy's Neptune in this P-3E developed jointly by the Navy and Lockheed for use in reconnaissance missions. Above shown is the glow of the points produced by the DeWane alarm system.

A NEW DESIGN Temperature Alarm System keeps its sensitive "fingers" on those points in the alternator drive system, should the temperature at any or all spots rise to 150°C, so alarm automatically signals in the flight compartment. The alternator drive system is so designed that it can be immediately disconnected before serious damage can happen.

THREE STANDARD resistance bulbs, a small control assembly (wgt. 1.5 lbs.), and a panel light make up the

system. The bulbs are installed as shown in the diagram. Each bulb continuously "feels" the temperature at each point. When the temperature reaches its critical level, the alarm comes on, and, if the temperature remains at normal, automatically shuts off.

THE SYSTEM can be adapted to any number of circuits and still remain in basic simplicity. For information concerning specific applications, write to—



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Westinghouse J40 powers F4D to world speed record

U.S. Navy establishes mark of 753.4 mph

A Westinghouse J40 turbojet powered the Douglas F4D "Skystar" to a new high speed of 751.414 mph as it recaptured the world speed record for the United States by averaging an official average of 753.4 mph over the required course.

Designed and manufactured by the Westinghouse Aviation Gas Turbine Division in South Philadelphia, Pa., the J40 and other outstanding turbojets now are being produced at the huge Westinghouse jet engine plant in Kansas City, Mo.

This J40 contribution to record-breaking jet progress is another example of Westinghouse turbojet leadership. Westinghouse Electric Corporation, Aviation Gas Turbine Division, Lester Branch P. O., Philadelphia 13, Pa. J-4002



A technical ground crew monitors the F4D flight by recording four individual passes over a three-kilometer course.



Official representatives check list of individual passes to determine average speed claimed by the Douglas F4D.



LCDR James E. Vardin returns after piloting Westinghouse-powered F4D to record-breaking run of 746 675, 761 464, 746 655 and 750 499 mph.

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as included in the pilot's handbook.
Another tidbit aid is in the tracks, according to the pilots. A *Zero* landing system is being developed by the Sperry Gyroscope Co., Ltd., with the cooperation of the air-minded people, it will present the pilot with a visual and precise indication of angle of attack during the landing run.
•Landing on a slippery surface should pose no particular problems, according to the Air Force post-instructors. Their Canards have slatted landing wheels at low a wheel to rotate as soon as a stall begins, even though the landing wheels are full on. This avoids the locked wheels and tendency of conventional landing systems.
A jet device, although not yet fully developed, was also mentioned by Chance and Tiesman as a possibility. They mentioned that the dog of the surprise still could be useful in diverting the landing run. Below 90 knots it is still possible to keep the nose high, which of course is a high-angle attitude. This will add to the decelerating force on the upstroke, and is in almost as effective as landing, the pilots say.
•The question of control tail or tail-back, as turbulence was fully answered by Chance and Tiesman. Both pilots were in agreement with the B-4C fact in thinking that they felt no need for such a landing.
They also emphasized the fact that there is a definite stick force on the Control due to the spring capsule in the control column, this force is felt as shock deflection, increase to large values. It is not to be confused with the small transient control deflection caused by atmospheric turbulence which cannot be felt through the Control system as it now is built.

Wright Group Plans To Rebuild Kitty Hawk

A project to recreate the site of the Wright Brothers historic first flight nearby in a contest in 1903 has been undertaken by the Kill Devil Hills Society, National Park Service, Air Force and the North Carolina 50th Anniversary of Powered Flight Act.
The group is seeking \$25,000 to rebuild and occupy the Wright hangar, workshop, living quarters and the 60 ft wooden monard used for the first flights. The completed site will be as visited Dec. 14 at the start of a four-day tribute to the Wright Brothers at Kill Devil Hill.
Contributions can be sent to the Kill Devil Hills Memorial Society, 309 Walker Building, Washington, D. C. Envelope should be marked "Memorial Park, Kill Devil Hills, North Carolina." A list of all contributors will be displayed at the site.



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CLIDE TESTS of Lodestar by Lear, Inc., evaluate modifications made to improve engine efficiency to reduce drag. Cruising speed has been boosted from 250 to 300 mph without cost in power or fuel consumption by application of analytical method to glide test data.

Tests Help Boost Lodestar Speed

The engineering technique that helped set a world's distance record for sailplanes has boosted the cruising speed of a special Lockheed-built, Lear-modified Lodestar by 50 mph.

These extraordinary data obtained in previous and present flights have been analyzed in a technique especially developed for airplane research by Dr. August Rappert, head of the Aerodynamics Dept. at Mississippi State College. The results of such flight tests indicate prospective areas for investigation of drag reduction.

Using the technique, Rappert—who has been assisted by Lear, Inc., to give the performance phase of Lodestar modifications—has proved the Lear engine modification has speeded the Lear engine's cruise speed from 250 to 300 mph, at no cost in fuel or power.

This program is the first application of Rappert's method to powered aircraft in order to work with the B-1's subsonic, the glide ratio was improved from a ratio of 30 to a value of 40. R. H. Johnson, who developed the sailplane at Mississippi State, used the craft in its final form to set a world's distance record of 535 miles.

Behind the Analysis: The basis of the new method is to use the sky as a windtunnel. Rappert says that even if full-scale tunnel tests could be performed on the Lodestar, they couldn't because there isn't any tunnel large enough—such tests would be of doubtful value because of interference and tunnel wall effects. Furthermore, the cost would be very large.

Flight tests were the alternate approach. Some years back, a group of powered sailplanes with wings removed had been tested at Mississippi State by towing them to 10,000 ft. Sinking speed measurements were made in the glide after release, and from these data aerodynamic coefficients were computed.

In the Lear test, research pilot Ed Swenberg clearly the Lodestar to 10,000 ft., cuts the engines, feather the propellers and glides to 10,000 ft. At that altitude, the engines are started again, and the climb and glide are repeated.

Engine brake horsepower is measured by a transducer during powered flight, and compared with the thrust horsepower determined in the glide. The ratio of THP (available) to HP (required) determines overall propulsive efficiency. Working backwards from required power will also define the true drag coefficient of the airplane.

The method can be proved from performance theory, Richard von Mises' "Theory of Flight" gives such a presentation.

Working With Data: The combination of these flight test data and precise tables of the lift patterns in wing permits a diagnosis of the airplane's balance. Modification follows, then a succeeding series of flight tests is run, aimed at optimizing the modifications.

Example: On the Lodestar, a new cowling—designed by Douglas Ince, chief engineer of Lear's aircraft division—has already reduced drag considerably. The cowling has been evaluated as an improvement by these flight tests. By combined series of tests, the drag reduction value of such change in configuration can be found and assessed in terms of the cost of the change.

Aircraft Industry Is California's Largest

Los Angeles—Largest of the aircraft industry in the nation's economy is spelled out in detail in a survey by Aircraft Industries Assn.

The Angeles, center of the industry, was chosen for the nation's largest aircraft now is the second largest

manufacturing industry in the U. S. Aircraft and parts firms the largest manufacturing industry in the Los Angeles metropolitan area and in the entire state of California, the survey shows.

► \$768-Million. Ferrell-In September 1953, nearly 162,000 persons were employed in an airplane—Douglas, Hughes, Lockheed, North American, Northrop and Sikorsky. With total aircraft-making employment in the area of 647,000, this meant one of every four was working in aircraft and aircraft parts manufacturing.

The AIA survey reports the six companies provided employment for more men and women in Los Angeles than the next three making industries combined.

What the aircraft payroll of \$768 million a year means to the community was estimated by AIA. The total payroll of nearly \$1 billion a day was spent at a rate of \$3.2 million a week for power and water, \$2.2 million for automobiles, fuel and motor, \$1.3 million for clothing, \$1.2 million for medical services, \$1.2 million for personal services, bathing, dry-cleaning, beauty shops, \$938,000 for furniture and household appliances, \$623,000 for housing and building materials, \$350,000 for entertainment and \$300,000 for drugs and medicals.

► \$76-Million Spending—This amount poured into normal trade channels, says AIA, would support more than 5,400 retail stores, 3,000 doctors, dentists and dentists, nearly 2,000 service stations, thousands of food markets, hardware stores, shoe shops, jewelers, restaurants and taverns.

More than 15,000 teachers were needed to educate the children of aircraft industry employees.

The sex firms involved are spending \$478 million annually with local merchants and subcontractors for materials and services ranging from paper clips to complete aircraft designs.

► Concentrated. Gasping—effluent backlog of the six companies is more than \$5.5 billion—nearly as much as the total amount of currency on deposit in nationwide banks. The amount they pay in local taxes is more than \$13 million annually, AIA says.

Consolidated sales for these firms during fiscal 1953 amounted to about \$1.7 billion, more than the combined total of agriculture, petroleum, autos and construction.

Scanning up these impressive statistics, AIA concludes:

"In the metropolitan area is located one of the most concentrated groupings of major industry anywhere in the world. This concentration has given rise to an unaffiliated but unduplicated claim for Los Angeles as the air capital of the world."

Flexibility in manufacturing to meet rigid schedules

One of America's largest subcontractors, Twin Coach Aircraft Division is probably unique in its flexibility to produce major assemblies for many different aircraft types.

This flexibility—combined with Twin's experienced manpower, modern facilities and equipment—means Twin can design and build necessary tooling... can produce on quantity and on time even the most complex, major assemblies.

Special parts production techniques eliminate delays, keep assembly lines rolling at top speed.

This smooth efficiency is typical of Twin Coach Aircraft Division plants.

It enables prime contractors to set and hold to rigid schedules for major aircraft divisions, the dependable source for every type of major airframe assembly.

A-101

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TWIN COACH—a currently producing major assemblies for C-119, C-124, C-130, C-130A, C-130B, C-130C, C-130D, C-130E, C-130F, C-130G, C-130H, C-130I, C-130J, C-130K, C-130L, C-130M, C-130N, C-130O, C-130P, C-130Q, C-130R, C-130S, C-130T, C-130U, C-130V, C-130W, C-130X, C-130Y, C-130Z, C-130AA, C-130AB, C-130AC, C-130AD, C-130AE, C-130AF, C-130AG, C-130AH, C-130AI, C-130AJ, C-130AK, C-130AL, C-130AM, C-130AN, C-130AO, C-130AP, C-130AQ, C-130AR, C-130AS, C-130AT, C-130AU, C-130AV, C-130AW, C-130AX, C-130AY, C-130AZ, C-130BA, C-130BB, C-130BC, C-130BD, C-130BE, C-130BF, C-130BG, C-130BH, C-130BI, C-130BJ, C-130BK, C-130BL, C-130BM, C-130BN, C-130BO, C-130BP, C-130BQ, C-130BR, C-130BS, C-130BT, C-130BU, C-130BV, C-130BW, C-130BX, C-130BY, C-130BZ, C-130CA, C-130CB, C-130CC, C-130CD, C-130CE, C-130CF, C-130CG, C-130CH, C-130CI, C-130CJ, C-130CK, C-130CL, C-130CM, C-130CN, C-130CO, C-130CP, C-130CQ, C-130CR, C-130CS, C-130CT, C-130CU, C-130CV, C-130CW, C-130CX, C-130CY, C-130CZ, C-130DA, 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1953 Market Action Of Airline Common Stocks

Company	1952 Close	1953 Range		1953-52 Change	Percent to 1952 Close	
		High	Low		Amount	Percent
American	125 1/8	127 1/2	122 1/4	121 1/2	11 1/2	12 1/2%
Boeing	17 1/8	17 3/4	16 1/2	16 1/2	1 1/2	8 1/2%
East	11 1/4	11 3/4	10 1/2	10 1/2	1 1/2	13 1/2%
Continental	22 1/2	24 1/2	21 1/2	21 1/2	1 1/2	6 1/2%
Northwest	7 1/2	7 3/4	6 1/2	6 1/2	1 1/2	20 1/2%
Delta-GAL	30 1/2	31 1/2	29 1/2	29 1/2	1 1/2	5 1/2%
Eastern	24 1/2	25 1/2	23 1/2	23 1/2	1 1/2	6 1/2%
United	16 1/2	16 3/4	15 1/2	15 1/2	1 1/2	9 1/2%
Western	6 1/2	6 3/4	5 1/2	5 1/2	1 1/2	23 1/2%
Northwest	22 1/2	24 1/2	21 1/2	21 1/2	1 1/2	6 1/2%
Post-Imperial	4 1/2	4 3/4	4 1/4	4 1/4	1 1/4	30 1/2%
TWA	17 1/2	18 1/2	16 1/2	16 1/2	1 1/2	8 1/2%
United	24 1/2	25 1/2	23 1/2	23 1/2	1 1/2	6 1/2%
Western	24 1/2	25 1/2	23 1/2	23 1/2	1 1/2	6 1/2%

ATCOTTER WALKER

Why Have Airline Stocks Dropped?

Here are some of the reasons investors are playing hard-to-get, even though earnings approach new peak.

Despite favorable airline earnings last year, continuing well into 1953, equities of the group have experienced declining market valuations.

The evidence **AVIATION WEEK** compilation shows of the market action of major airline common stocks spotlight their hesitations.

The general market, as measured by a popular composite stock index, is now down an average 10% from the 1952 record closings. Airline equities have fared little the, say from 31-1% to as little as 3-3%. By contrast, the stocks of a number of aircraft manufacturers showed a marked increase in the same period. See **AVIATION WEEK** Oct. 13, p. 49.

Low Point-Airline shares are now at about their lowest levels in some three years. This condition prevails despite the industry's all-time record earnings of 1952 which, on the average, may be repeated this year.

Only Colonial Airline displays any increase in market price thus far this year. This gain, 5-9%, is due entirely to the company's pending acquisition by Eastern, recommended by a CAB examiner and now subject to White House approval.

Continental Airlines shows the small-

est percentage decline of the group, being off only 1-3% from the 1952 year-end. A relatively limited market interest has evidently had a tendency to minimize price fluctuations in this issue.

The steepest decline (31-1%) has been experienced by the common stock of **Darnell Airways**. The company has sustained heavy losses as its Latin American operations, which may be subject to adjustment as cost rate determinations. The acquisition of Mid-Continental has also been a factor in contributing to Darnell's losses.

While having the lowest unit market price, Northwest's common stock shows a substantial market loss of 27-3% during the year. Despite an excellent transportation operations record, NWA has not been able to overcome the public's hesitancy to heavily subsidized carriers.

Among the Big Four, Eastern shows the best resistance to the decline, being down only 13-3%. The company's fine earnings record and, particularly, its known conservative accounting policies may have contributed to this.

No Premiums—One of the most significant developments in recent market price trends of the airlines is the withdrawal of most firms' air carrier equities as discounts in their respective book-

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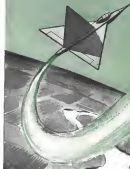
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values in past years most truckload equities, add in the market at substantial premiums over book.

Only American's private equity, with a current book value estimated at around \$5.06 per share, commands a noteworthy market premium. The high degree of leverage inherent in the company's capitalization, together with a sustained earnings record, probably accounts for this condition. Eater's common stock is currently estimated to have a book value representing present market quotations.

For American's equity, with a book value of \$56.07 at the 1972 year-end, and the greatest discount price on our market prices, about 40%.

► **Subsidiary Effect**—These disparities (reflecting the overriding influence that earnings and the potential profits outlook of each company have on determining the course of market prices. The nature and quality of earnings also come in for careful evaluation. In other words, earnings subject to sizable discounts are not always regarded as fully dependable. Further, while capital gains realized on the sale of property are higher net worth positions, they are not given the same high regard which sustained earnings from normal operations get.

Nevertheless, unlike equity of the major companies currently sell at low multiples of anticipated earnings for 1973. Earnings of the leading names rose still at levels averaging from five to six times projected 1973 earnings. His notably, this is about the lowest that earnings have ever been evaluated for the aviation.

► **Other Factors**—But it is not difficult to find the basis for this relatively low evaluation. Shifting governmental policies confuse investors and give rise to uncertainties as to subsidies in the industry. The highly technical aspects of operations where rising costs and lowering unit increases pose a real threat to earnings are not conducive to attracting potential investors.

The need for hardheaded financial analysis to acquire consistently growing facilities has made for limited dividend distributions. This is not viewed favorably by many would-be investors.

All of these elements, and the market quotations for airline equities in themselves, clearly indicate that a decidedly speculative tone still underlies the air transport industry. The one healthy feature remains in the strong growth aspects of the industry, which promises to achieve new peaks in traffic and earnings.

But all this has to be converted into sustained and dependable earnings before airline equities may be regarded as quality investment choices.

—Selig Altschul

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Annual tooling facilities of Teco Mfg. Co. are reviewed in a brochure available from the firm. Write in care of the Aircraft Tooling Division, 42-99 131st St., Long Island City 1, N. Y.

A bibliography on low temperature characteristics of metals, 7504-June 1955, with author index, being distributed by AEC U. S. and foreign articles, translations, pamphlets and books. Write International Nickel Co., Inc., Edison, Manufacturers Literature Section, New York 5, N. Y.

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Link supply communication as well as the electro-mechanical integration of the analog computer systems of Link Flight Simulators

the connecting
link between
ground and sky



LINK invites employment applications from engineers and draftsmen.

available from Federal Machine Tool Co., Cincinnati 25, Ohio. . . . Entire line of stock gears, speed reducers, sprockets and chains and special gears is contained in speed-reducer catalog available from Great Gear Works, Inc., 154 West Second St., Boston 27, Mass.

Good power units for aircraft, including units for 28 V. d.c., are described in folder MGC-103 available from Motor Generator Corp., Robert Brothers ABline, Troy, Ohio. . . . Chereblad twin cylinder diesel complete line including data on fuel gear needed for application. Write: Woodward Co., New Brighton, Pa. . . . Electric clutch control for power actuators is described and described in Catalog 99 being issued by Meyer Division of Minneapolis-Honeywell Regulator Co., Minneapolis 11.

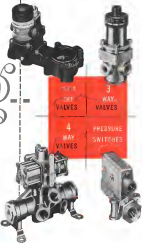
Windows open, made of high-tensile steel, specially and valve with a tensile coat of 150 psi tensile strength, are described in special-bound booklet sample of the product is attached to booklet. Write: Rochester Paper, Inc., Colpaper, Va. . . . Ultrasonic measuring Model Model 55101 for measuring wall thickness of metals and other materials and for locating internal defects is described in Bulletin 1010 available from J. W. Durr Co., Englewood, N. J.

Microfilm Plate and Sheet to Reduce Weight a title of folder giving dimensions, tolerances and other data on different grades of products fabricated by Brooks & Peltier, Inc., Detroit 16 Mich. . . . Hydro-Crane flexible jaws for use with all types of stretch-forming production equipment are covered in folder available from Balluff Machine Works, Inc., 1700 E. Grand Ave., El Segundo, Calif.

Publications Received

- **The Flying Engineer's Assistant**—published by G. P. Putnam's Sons, New York N. Y.—\$1.95. A pictorial history of man's conquest of the air.
- **Anytime Design to Build**—published by Edward Brothers, Inc., New York, Mich. How to arrive at an airplane design from a definite set of specifications.
- **Thompson's Air Age**—published by Robert & Company, Inc., 152 Madison Ave., New York 16, N. Y.—\$1.95. A popular examination of our predictable future in the Air Age, this report considers the human and technical factors of the airplane's effect on society.
- **Design for Decision**—by Louis D. J. Ruppel, by The Macmillan Co., 60 Fifth Ave., New York 11, N. Y.—\$4.25. The standard curriculum for Cornell University's Medical College has accepted to render medical students and the method of data of decision meaningful for the human and the research worker.

hi-g
for aircraft



In engineering terms "high g" means high precision. Even. Its performance comes 750 g. means General Controls' reliable line of hydraulic pressure, temperature level and flow controls for heavy duty under maximum static loads to 3000 psi. The line of low-temperature electrohydraulic pilot and shutoff valves—manual and motor-driven gas valves—electrohydraulic selector valves—gauge and differential type level controls—all light in weight, compact in design and trouble-free in operation. A leading a great variety of liquids and gases at a wide temperature range. For high efficiency performance under extreme vibration and acceleration conditions (in General Controls' High Controls) . . . the best in automatic control for any machine that rolls, floats or flies.

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B-52 STRATOFORTRESS and B-47 STRATOJET equipped with **SAGINAW** **BALL BEARING SCREWS**



Saginaw Screws actuate the trim tabs on the new B-52 Stratofortress, built at the Seattle plant of Boeing Airplane Company, and both trim tabs and landing gear controls on the new B-47 Stratojet, built at the Boeing plant in Wichita. These highly efficient screw mechanisms transmit the rotary-to-linear force through rolling steel balls with only a fraction of the torque required for ordinary threaded-in screws, thus resulting in important weight savings. They can be actuated with electric, hydraulic or pneumatic units. Write today for our Engineering Data Book.

Saginaw STEERING GEAR DIVISION

GENERAL MOTORS CORPORATION
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MANUFACTURERS OF SAGINAW POWER STEERING



47

PRODUCTION



MODIFIED BOEING C-97 with redesigned interior for carrying patients, personnel or cargo, leaves Temco Aircraft Corp. a Greenville, Tex., conversion center where Temco is working a number of Stratofighters for Military Air Transport Service. Interior yields to suit any mission task less than two hours.

Temco Turns Out 'Triple-Threat' C-97s



BEFORE modification, Boeing Stratofighters interior looked like this. Note troop seats collapsed against cabin walls. Storage for litter was rudimentary.



AFTER modification by Temco, new cabin has 60 can durable seats, shows failed to prevent cargo storage. Wichita Flight in during even flight installation.



MIXED LOADS of patients and personnel can be flown using this layout. Litter can be released for gravity. Usually 40 personnel or 54 litters can be crated in the modified Stratofighters.



INSPECTION of revised C-97 interior is made by NAF's Lt. Col. Joseph Smith (foreground). In white shirt is D. L. Haas who loaded Temco's Stratofighter conversion team.

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Warner's Extension Power Brake Valve, shown above, has an exclusive hydraulic feed-back feature to give the pilot immediate warning in event of hydraulic system failure. This compact, lightweight, space-saving valve is adaptable to a wide range of system and brake pressures.

Warner is qualified by experience and facilities for the design and production of critical hydraulic equipment for a wide range of uses. Warner engineers will welcome an opportunity to assist you in the development of special hydraulic equipment to meet your particular requirements.

Write for your copy of the illustrated folder shown above describing typical examples of Warner precision hydraulic equipment.

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DESIGNERS AND MANUFACTURERS OF PUMPS • VALVES • ACTUATORS



WINDING LINE put a barrel into shape for Pennell impregnator.

Resin Impregnator Cuts Porosity Rejects

Impregnator garbion castings for A. V. Roe Canada, Ltd.'s Orinda helicopter are being impregnated with Pennell 1253 to minimize porosity rejection from porosity.

The garbions are manufactured by York Gears Ltd., Toronto, under sub-contract from Aero. The vacuum impregnating equipment is made by F. J. Stokes Machine Co., Philadelphia. The Pennell, a synthetic thermosetting resin, is a General Electric Co. product, supplied in Canada by Canadian General Electric Co. Ltd.

Castings are delivered to the impregnating operation directly from the foundry after removal of flash. Unless they are oily or greasy, there is no preliminary cleaning. Where required, cleaning is done in a 30-sec. pass through a vapor-type degreaser.

The castings, varying in size, are loaded individually into the bluish vacuum impregnating chamber. From 15 to 100 pieces may be treated in a single batch. Vacuum is held for one hour to remove all air from the casting pores. Pennell is then drawn into the tank until the castings are covered, and the vacuum is maintained for another half hour. An atmosphere into the tank is maintained at 100 psi for another hour to speed up the impregnation process. Excess Pennell is returned to the reservoir where the air pressure is reduced to 5 psi.

Castings are then cleaned in a hot-water wash and cold detergent solution at 170°F. This removes any excess



Can you see the BIG difference?

On the face of it, Avion's Two-Unit Fuel Gage looks like previous systems, but there's a big and important difference behind it all.

Behind this Avion dial face (shown here three times actual size) is Avion's latest new concept of fuel gage system "packaging."

For example, you'll find three units behind a dial: an indicator unit, motor and balancing potentiometer, and elsewhere a bridge-amplifier, a shunt-motor and a tank unit.

Now, as the Avion Two-Unit Gage, the primary components for the bridge and amplifier functions have been built right into the indicator unit.

The result: a fuel gage system of "plug-in, plug-out" simplicity, which weighs 30% less and eliminates the need for any field calibration.

What a BIG difference this makes in money!

First of all, the better system costs less. Less time is spent in installation. Less wiring and connectors are needed. Less maintenance is required, because there are fewer components to maintain. Trouble-shooting time is cut for the crew member. And fewer parts must be stocked for maintenance and repairs.

Because of this new package, Avion gages are now "shelf items." They're completely interchangeable in the aircraft for which they are designed.

Additional features for fuel management can be easily integrated into the basic Two-Unit system.

The Avion Two-Unit Fuel Gage is now available to meet your production programs. The indicator is available in either large or small size, with all varieties of dial configurations.

Every month, Avion produces over ten thousand major instrument components for the aviation industry.

The Avion Two-Unit Fuel Gage will make such a BIG difference in your cost sheet, we suggest that you write or call for more information today.



AVIATION ENGINEERING DIVISION

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Screen Room Filters



BETTER BY FAR BY SPRAGUE

The power lines entering your screen room must be cooled or else the efficiency of your shielded enclosure is greatly reduced.

Sprague engineers, long experienced in the manufacture of radio noise filters for all applications, have developed numerous types specifically for shielded enclosures. A typical installation is shown at right. Note that each filter is provided with a shielded end cap adaptable to most screen room power leads.

Perhaps we can help you improve the performance of your screen room. Write Sprague Electric Co., 327 Marshall Street, North Adams, Massachusetts for further information on modern, high attenuation filters for screen rooms.



Sprague, on request, will provide you with complete application engineering service for optimum results in the use of radio noise filters.

YOU CAN DEPEND ON
SPRAGUE

Presented on the surface of the casing. Finally, casings are placed at the same temperature and baked in a curing oven at 200F for another hour to thoroughly set the plastic.

GE Expert Praises British Jet Engines

British production turbojets are noisy, powerful, have better fuel consumption and give some thrust per pound of weight than American engines. But U. S. jets are more compact with smaller frontal area.

These views were expressed by David Cochran of General Electric's Aircraft Gas Turbine division at a recent Wings Club luncheon in New York, where he gave his impressions of the Society of British Aircraft Constructors exhibit at headquarters and his subsequent visit to the Bristol jet engine manufacturing plant.

The British apparently take more pains than we to cool even every ounce of metal that is not doing any work.

Cochran estimated that the U. S. makes many more jet engines in a day than the British produce in a week. GE jet aircraft engines alone have by now accumulated more than 1,000,000 hours total operating time.

He compared Rolls-Royce's technique of carefully machining out the 3,000 odd compressor turbine blades which go into a modern jet engine with the mass production forging techniques used by General Products, who long out thousands of blades a day. He conceded that the American method required less seriously greater production facilities.



VALVE FOR F-402

The pressure forcing valve is the first product to be completely dropped and manufactured at the Allentown Manufacturing Co.'s new \$4 million plant at Phoenix, Ariz. Its function is to control coolant air pressure. It prevents build up, valve automatically drops once air. Used as used on General's self-seal, new offshoot #1012 in high coolant pressure in the aircraft engine and electronic heat shield houses supercritical engine equipment.



REFRASIL HITCO THERMO-CAST INSULATION

FOR THE DOUGLAS C-124 GLOBEMASTER

Insulation performs a big job in the Maximor C-124 Globemaster. This dry quartz, designed and manufactured by Douglas Long Beach Plant, depends on HITCO Insulating Blankets for efficient thermal and acoustical insulation.

Thermo Cast's Cables Insulating Blankets protect 200 fully equipped troops against noise, heat and cold in the huge 50,000 pound capacity cargo cabin. Refrasil® Performed High Temperature Insulating Blankets are fabricated of Refrasil® felt, sandwiched between two layers of .003" stainless steel foil. On the C-124 they are installed on the antiflying Hoster Duct in the tail section and in the wing tips to conserve heat and protect surrounding structure. HITCO insulation is specified because of its lightweight and superior insulating qualities for high temperatures.

HITCO engineering counsel is available to you without charge to help you solve your high temperature or nonmetallic insulating problems. Write today for illustrated literature.



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design where inches
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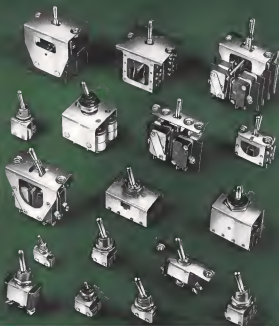
• Republic Aviation's F-84F Thunderstreak jet fighter* which depends on MICRO toggle switches for important electrical controls.

Provide accurate multiple circuit controls in REPUBLIC'S F-84F Thunderstreak

• Control of important electrical circuits in the new REPUBLIC F-84F Thunderstreak jet fighter is the function of MICRO's SATIS Toggle Switch... an assembly of 16 subminiature switches operated by a single bat handle.

The MICRO subminiature switches used in this assembly are less than $\frac{3}{16}$ " long and weigh less than $\frac{1}{15}$ of an ounce. The assembly provides an unusually efficient, compact and lightweight assembly for the control of sixteen circuits. Eight of the switches operate with each direction of the toggle motion.

At the right is shown the MICRO toggle switch assembly before and after installation in the cockpit of the Thunderstreak.



• Here are seventeen different types of MICRO toggle switches developed to meet the most exacting requirements of aircraft design engineers. Whether design calls for a toggle switch (a) heretofore needed for constantly upward altitude or environmental changes, or (b) with sealed toggle lever, or (c) extremely small to fit in tight quarters, or

(d) assemblies for switching multiple circuits... MICRO has the switch assembly to best fit your needs.

MICRO engineers are specialists in solving difficult aircraft switch design problems. Their assistance is available to you. Contact the nearest MICRO branch office for full information or engineering cooperation.

MICRO
MAKERS OF PRECISION SWITCHES
FREEPORT, ILLINOIS

A DIVISION OF
MINNEAPOLIS-HONEYWELL REGULATOR COMPANY



In tomorrow's JET POWER PLANTS



LEBANON Castings are at work



Lebanon Steel Foundry, the largest producer of centrifugal castings for jet engines, is proud to have collaborated with the Wright Aeronautical Division, Goodyear Engine Corporation, in developing this unusual near-net-casting. It incorporates many features to size and in accurate location, requiring no machining. Of special high-strength alloy steel, this part is quite large in size and is designed to operate satisfactorily under high temperature conditions in one of Wright's newly designed jet power plants.

Lebanon Steel Foundry supplies castings to Wright for the J-65 (Supercub) turbojet engine, which it now in production, and is producing experimental parts for the company's other advanced jet power plants.

LEBANON Castings

CARBON, SPECIAL ALLOY
AND STAINLESS STEEL

LEBANON STEEL FOUNDRY

LEBANON, PA.

PRODUCTION BRIEFING

• **Hiller Helicopters, Palo Alto, Calif.**, has added 100th copies of its assembly lines. The firm flew its first rotary wing aircraft in spring of 1944.

• **North Aircraft Division, MacGregor Heights, Mich.**, has been awarded two contracts for manufacture of major engine assemblies by Pratt & Whitney Division of General Motors and Republic Aircraft Corp.

• **American Helicopter Co.'s** wholly owned subsidiary, Planes Research, Inc., has purchased the assets of Pitts Engineering Corp., Costa Mesa, Calif.

• **General Electric Co.'s** &Ray Dept., Milwaukee, Wis., has received a nearly 100% increase in its original contract for several rocket motor contracts. Total awards now come to approximately \$4 million. More than 55% of the parts are being subcontracted, with more than 90% of the subcontractors classified as "small business."

• **Proton Gas & Products, Paterson, N. J.**, has received a \$1,351,000 contract to manufacture 500 accessory gas turbines for the Wright J65 Supercub turbojet. The gas turbine is approximately to build a new 16,000 sq ft heat treating plant adjacent to its 24,000 sq ft present facility.



RADIO MOCK-UP FOR CONNES

Recent success of Constellation in test set configuration at Lockheed Aircraft Service Co., Burbank, Calif., has called for extensive use of the radio transmitter mockups, three being tested and one already checked in advance of flight schedule. Thomsen is presently fabricating, assembling, painting and testing output components.



equal a great future for you!

Working in the aviation electronics industry brings in Westinghouse, where engineers design the first completely airborne electronic systems for control systems, and the first jet engine turbojet engine employing magnetic amplifiers. In its new multi-engine turbojet Air Jet, which is wholly unique, Westinghouse has assembled by flight engineers, past the test and most complex research and test facilities that any company has, not located the entire operations adjacent to Westinghouse International Airport, one of the country's newest and largest airports.

The long list of aircraft electronic products are being developed and produced at Westinghouse Air Jet has created a need for outstanding engineers who can meet the challenge of this demanding new work. The firm we want will be in the business key position as a pioneer team when the future is defined.

Salaries are given, depending on qualifications, experience and ability. In addition to a highly competitive salary and bonus, opportunities in advanced development and production testing atmosphere, Westinghouse offers all the usual employee benefits (EEO).

TELEPHONE ENGINEER

LOCATION: Special Systems Section of Development Engineering.

DUTIES: Analysis and design of hydraulic valve systems actuators and servomechanisms.

REQUIREMENTS: Six or more years experience in hydraulic design. Engineering degree — BS or MS in Engineering.

SYSTEMS ANALYSIS SPECIALIST

LOCATION: Analytical Section of Development Engineering.

DUTIES: Specialist in operations research. Analysis of aircraft tactical attack problems. Evaluation of detection, recognition and destruction probabilities of aircraft combat systems.

REQUIREMENTS: Capable of applying probability theory and statistics. With or without Ph.D. No previous experience necessary if Ph.D.

RADAR DESIGN CONSULTANT

LOCATION: Missile Radar Section of Electronics Engineering Division or Detection Systems Section of Development Engineering Division.

DUTIES: Consultant and adviser on airborne fire-control radar and missile guidance systems.

REQUIREMENTS: Some background in each of the following fields. With a broad knowledge of at least one: Antenna Design, Circuit Design, Servomechanisms.

BS degree in Electrical Engineering and 4 to 10 years experience in radar or missile field also required.

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INVERTERS — 400 CYCLE OUTPUT									
Type Number	INPUT			OUTPUT			Max. Alt. Feet	Rated to Run Hours	Standard to Run Hours
	Volts	Amperes	Watts	Volts	Phase	Rating			
4070	27.5	1	25	1	1	1	5000	UNLIMITED	1 yr.
4074	27.5	2	50	1	1	2	5000	UNLIMITED	1 yr. (1000 hrs.)
4075	27.5	3	75	1	1	3	5000	UNLIMITED	1 yr.
4076	27.5	4	100	1	1	4	5000	UNLIMITED	1 yr.
4077	27.5	5	125	1	1	5	5000	UNLIMITED	1 yr.
4078	27.5	6	150	1	1	6	5000	UNLIMITED	1 yr.
4079	27.5	7	175	1	1	7	5000	UNLIMITED	1 yr.
4080	27.5	8	200	1	1	8	5000	UNLIMITED	1 yr.
4081	27.5	9	225	1	1	9	5000	UNLIMITED	1 yr.
4082	27.5	10	250	1	1	10	5000	UNLIMITED	1 yr.
4083	27.5	11	275	1	1	11	5000	UNLIMITED	1 yr.
4084	27.5	12	300	1	1	12	5000	UNLIMITED	1 yr.
4085	27.5	13	325	1	1	13	5000	UNLIMITED	1 yr.
4086	27.5	14	350	1	1	14	5000	UNLIMITED	1 yr.
4087	27.5	15	375	1	1	15	5000	UNLIMITED	1 yr.
4088	27.5	16	400	1	1	16	5000	UNLIMITED	1 yr.
4089	27.5	17	425	1	1	17	5000	UNLIMITED	1 yr.
4090	27.5	18	450	1	1	18	5000	UNLIMITED	1 yr.
4091	27.5	19	475	1	1	19	5000	UNLIMITED	1 yr.
4092	27.5	20	500	1	1	20	5000	UNLIMITED	1 yr.
4093	27.5	21	525	1	1	21	5000	UNLIMITED	1 yr.
4094	27.5	22	550	1	1	22	5000	UNLIMITED	1 yr.
4095	27.5	23	575	1	1	23	5000	UNLIMITED	1 yr.
4096	27.5	24	600	1	1	24	5000	UNLIMITED	1 yr.
4097	27.5	25	625	1	1	25	5000	UNLIMITED	1 yr.
4098	27.5	26	650	1	1	26	5000	UNLIMITED	1 yr.
4099	27.5	27	675	1	1	27	5000	UNLIMITED	1 yr.
4100	27.5	28	700	1	1	28	5000	UNLIMITED	1 yr.
4101	27.5	29	725	1	1	29	5000	UNLIMITED	1 yr.
4102	27.5	30	750	1	1	30	5000	UNLIMITED	1 yr.
4103	27.5	31	775	1	1	31	5000	UNLIMITED	1 yr.
4104	27.5	32	800	1	1	32	5000	UNLIMITED	1 yr.
4105	27.5	33	825	1	1	33	5000	UNLIMITED	1 yr.
4106	27.5	34	850	1	1	34	5000	UNLIMITED	1 yr.
4107	27.5	35	875	1	1	35	5000	UNLIMITED	1 yr.
4108	27.5	36	900	1	1	36	5000	UNLIMITED	1 yr.
4109	27.5	37	925	1	1	37	5000	UNLIMITED	1 yr.
4110	27.5	38	950	1	1	38	5000	UNLIMITED	1 yr.
4111	27.5	39	975	1	1	39	5000	UNLIMITED	1 yr.
4112	27.5	40	1000	1	1	40	5000	UNLIMITED	1 yr.
4113	27.5	41	1025	1	1	41	5000	UNLIMITED	1 yr.
4114	27.5	42	1050	1	1	42	5000	UNLIMITED	1 yr.
4115	27.5	43	1075	1	1	43	5000	UNLIMITED	1 yr.
4116	27.5	44	1100	1	1	44	5000	UNLIMITED	1 yr.
4117	27.5	45	1125	1	1	45	5000	UNLIMITED	1 yr.
4118	27.5	46	1150	1	1	46	5000	UNLIMITED	1 yr.
4119	27.5	47	1175	1	1	47	5000	UNLIMITED	1 yr.
4120	27.5	48	1200	1	1	48	5000	UNLIMITED	1 yr.
4121	27.5	49	1225	1	1	49	5000	UNLIMITED	1 yr.
4122	27.5	50	1250	1	1	50	5000	UNLIMITED	1 yr.
4123	27.5	51	1275	1	1	51	5000	UNLIMITED	1 yr.
4124	27.5	52	1300	1	1	52	5000	UNLIMITED	1 yr.
4125	27.5	53	1325	1	1	53	5000	UNLIMITED	1 yr.
4126	27.5	54	1350	1	1	54	5000	UNLIMITED	1 yr.
4127	27.5	55	1375	1	1	55	5000	UNLIMITED	1 yr.
4128	27.5	56	1400	1	1	56	5000	UNLIMITED	1 yr.
4129	27.5	57	1425	1	1	57	5000	UNLIMITED	1 yr.
4130	27.5	58	1450	1	1	58	5000	UNLIMITED	1 yr.
4131	27.5	59	1475	1	1	59	5000	UNLIMITED	1 yr.
4132	27.5	60	1500	1	1	60	5000	UNLIMITED	1 yr.
4133	27.5	61	1525	1	1	61	5000	UNLIMITED	1 yr.
4134	27.5	62	1550	1	1	62	5000	UNLIMITED	1 yr.
4135	27.5	63	1575	1	1	63	5000	UNLIMITED	1 yr.
4136	27.5	64	1600	1	1	64	5000	UNLIMITED	1 yr.
4137	27.5	65	1625	1	1	65	5000	UNLIMITED	1 yr.
4138	27.5	66	1650	1	1	66	5000	UNLIMITED	1 yr.
4139	27.5	67	1675	1	1	67	5000	UNLIMITED	1 yr.
4140	27.5	68	1700	1	1	68	5000	UNLIMITED	1 yr.
4141	27.5	69	1725	1	1	69	5000	UNLIMITED	1 yr.
4142	27.5	70	1750	1	1	70	5000	UNLIMITED	1 yr.
4143	27.5	71	1775	1	1	71	5000	UNLIMITED	1 yr.
4144	27.5	72	1800	1	1	72	5000	UNLIMITED	1 yr.
4145	27.5	73	1825	1	1	73	5000	UNLIMITED	1 yr.
4146	27.5	74	1850	1	1	74	5000	UNLIMITED	1 yr.
4147	27.5	75	1875	1	1	75	5000	UNLIMITED	1 yr.
4148	27.5	76	1900	1	1	76	5000	UNLIMITED	1 yr.
4149	27.5	77	1925	1	1	77	5000	UNLIMITED	1 yr.
4150	27.5	78	1950	1	1	78	5000	UNLIMITED	1 yr.
4151	27.5	79	1975	1	1	79	5000	UNLIMITED	1 yr.
4152	27.5	80	2000	1	1	80	5000	UNLIMITED	1 yr.
4153	27.5	81	2025	1	1	81	5000	UNLIMITED	1 yr.
4154	27.5	82	2050	1	1	82	5000	UNLIMITED	1 yr.
4155	27.5	83	2075	1	1	83	5000	UNLIMITED	1 yr.
4156	27.5	84	2100	1	1	84	5000	UNLIMITED	1 yr.
4157	27.5	85	2125	1	1	85	5000	UNLIMITED	1 yr.
4158	27.5	86	2150	1	1	86	5000	UNLIMITED	1 yr.
4159	27.5	87	2175	1	1	87	5000	UNLIMITED	1 yr.
4160	27.5	88	2200	1	1	88	5000	UNLIMITED	1 yr.
4161	27.5	89	2225	1	1	89	5000	UNLIMITED	1 yr.
4162	27.5	90	2250	1	1	90	5000	UNLIMITED	1 yr.
4163	27.5	91	2275	1	1	91	5000	UNLIMITED	1 yr.
4164	27.5	92	2300	1	1	92	5000	UNLIMITED	1 yr.
4165	27.5	93	2325	1	1	93	5000	UNLIMITED	1 yr.
4166	27.5	94	2350	1	1	94	5000	UNLIMITED	1 yr.
4167	27.5	95	2375	1	1	95	5000	UNLIMITED	1 yr.
4168	27.5	96	2400	1	1	96	5000	UNLIMITED	1 yr.
4169	27.5	97	2425	1	1	97	5000	UNLIMITED	1 yr.
4170	27.5	98	2450	1	1	98	5000	UNLIMITED	1 yr.
4171	27.5	99	2475	1	1	99	5000	UNLIMITED	1 yr.
4172	27.5	100	2500	1	1	100	5000	UNLIMITED	1 yr.

NOTE: U.S. input voltage shown is a nominal value of 27.5 volts, but all units are designed to operate from 27.0 to 28.0 volts. Input frequency shown are values in Hz (cycles per second).

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1000 Red Book Division, Batontown, N. J.

Thermal Optical Co., Inc., has opened a West Coast engineering office at 5890 West Adams Blvd., Culver City, Calif. R. A. Haddock has been appointed consulting engineer, optical engineering, and E. L. Forster has been named technical representative.

Hel-Cool Corp., Danbury, Conn., is recommending the use of the so-called "STI"—abbreviation of "standard thermal stress"—in all manufacturing, as the proper designation of type which provide threads for Hel-Cool units.

Loan Alfa Co., Milwaukee 7, Wis., has developed a new line of electric motors rated up to 40 hp at 1,500 rpm. It is a new design, fully enclosed fan-cooled, and engineered to meet all demands. New motors are built to meet new National Electric Manufacturers Association standards and the smaller frame sizes will be available beginning in January 1954, the firm states.

Beech Gives Awards For Aircraft Upkeep

Beech Aircraft Corp. has recently organized a program honoring suppliers, subcontractors, manufacturing departments, distribution and owners of planes produced by the Wichita firm.

An award will be made annually to the business owner in each of Beechcraft's domestic distribution territories on the basis of the condition of his plane at hand during maintenance tests conducted by representatives of the company each summer.

Airline owners will be honored, too, and parts suppliers for product performance, performance, maintenance, packaging, quantity supplied and compliance with delivery schedules.

Recognition will be given a Beech parts subcontractor and an assembly contractor. The outstanding maintenance, subassembly and assembly departments at each of Beechcraft's plants also will receive awards.

The outstanding Beech distributor will be recognized on the basis of customer and comments and reports from his territory.

Bendix Builds New Engineering Plant

Los Angeles—Bendix Aviation Corp. has begun construction of a new plant at North Hollywood for a \$150,000 engineering building, the fourth phase expanding its five-view.

The structure represents the first portion of a large engineering building and will house the aircraft, radio and by diesel engineering departments.

WHEN AIRCRAFT FLY FASTER



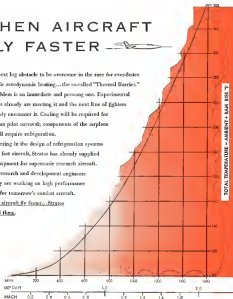
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AVIONICS



AIRLINE ELECTRONIC Engineering Committee of Avionics at Kansas City meeting

AEEC Acts on Avionic Problems

Engineers adopt tentative specs for Scellall system of ground-to-pilot signaling; radar tests studied.

By Philip Klein

Kansas City, Mo.—Scellall, a new system which enables an airline ground station to ring a buzzer in the cockpit of an airplane to which it wants to talk, received a tentative endorsement from the Avionics Electronic Engineering Committee (AEEC) of Aeronautical Radio, Inc., which met last recently to discuss mutual avionics problems.

The new selective calling system is intended to relieve critical pilots of the fatiguing task of continuously monitoring incoming communications channels, particularly during long flights.

Large Airlines—Express from more than 25 airlines, including British Overseas Airways Corp., Air France, Southwestern Airlines System, Trans Canada and Canadian Pacific airlines, attended the three-day AEEC meeting and the two-day maintenance seminar which followed.

Total attendance figure of 120 included more than 50 representatives from industry as well as the Navy's Fleet Logistics Air Wing, USAF Headquarters, Civil Aeronautics Administration, Federal Communications Commission and the British Embassy.

On the Agenda—Other topics, in addition to Scellall, on the AEEC agenda on which the group agreed to study further took action included the following:

- United Air Lines under test
- New VOR test facility
- New engine cooling systems
- Quick-disconnect radio rack drives

- Results of airborne DME tests.
- VME 350-channel communications specification.
- Change in ILS frequency plan.

Selectall

The American Airways first brought up the subject of Scellall to the AEEC about nine months ago. PAA felt that other airlines might also find its own pressing need for a selective calling system, thereby paying an industry-wide up price.

Meanwhile PAA's Pacific Alaska division decided to contract an airborne diagram of a calling system developed by Motorola (the material unit) and fight test it.

How It Operates—The Motorola system operates on the basis of a ground station transmitting two consecutive tone pulses, each of approximately 1 sec. duration. Each of the pulses con-



SPECULUM enables airline ground stations to flash a light in the cockpit of an airplane to which they want to talk. It requires installation of a small outdoor unit, like the PAA prototype shown.

tain two simultaneously transmitted tones (sequentially). The airborne Scellall unit, which connects to the regular 115 to 118 MHz system, contains four channeling rod elements, each tuned to respond to a single, but different, tone.

When a ground station broadcasts the first tone double-tone pulses (in proper sequence) corresponding to an airplane's assigned code, it triggers the airborne Scellall unit's door to flash a light to ring a buzzer in the cockpit.

A dual-channel airborne Scellall unit, mounted in a short half-ATR case, should weigh about 10 lb and sell for approximately \$100-\$150, a Motorola spokesman told the AEEC. Motorola shows a prototype unit.

Hundreds of Codes—The present AEEC spec calls for using 12 tones in the frequency range of 360 to 1,600 cps. This gives 2,970 different possible codes, but only 1,418 of these are recommended for use mainly because of the possibility of false triggering due to harmonics and cross-modulation effects.

If all 2,970 codes were used, there would be the chance of coming two in three months when only one was being called. Widely dispersed airline operations make this a somewhat remote possibility, and the consequences are not serious. The operating pilots usually "hang up." However, the AEEC decided to use only the 1,418 codes until more are required.

More Codes Possible—By using closer frequency spacing between tones, future airplanes the system to 3,910 assignable codes is possible, Motorola says. This would involve adding two new groups of 12 tones in the 300-1,600 cps band.

Since not all aircraft will be equipped with Scellall, and since the number of domestic airports and international airports now operating in the U.S. totals only 1,450, the members of AEEC members who feel that the system has adequate capacity to handle future airline growth.

After six months of flight tests on its own prototype unit, from San Francisco to Singapore, PAA is extremely enthusiastic about the new selective calling system. Kenneth Moore, PAA engineer, reported "essentially 100% performance through interference" at distances up to 2,500 miles, and no false triggering.

On the way to two operations where the ground agencies tried to move the plane on the first call, he immediately tried again and was successful, it was noted.

Some Reluctance—Despite PAA's enthusiasm, some AEEC members were reluctant to say "This is it." Representation of several airlines felt that interested operators should try out a few equipments to learn better about Scellall.

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port the entire radio system. Frank White of ATA reported that there was a possibility that the Air Navigation Development Board might sponsor the design of a satellite strap tube.

VOR Test Station

The Civil Aeronautics Administration and Eastern Air Lines have worked out an arrangement which allows the way for EAL, and other airlines, to provide and operate stand-alone test stations for many types of navigation receivers. Howard Mading of EAL reported CAA has asked the FAA to set up and operate the VOR test stations and the airlines linked the legal authorization to operate them.

► EAL to Operate the CAA's Under the new arrangement, CAA will manage the license responsibility for the EAL-owned test facility at Miami International Airport. In return, EAL will operate the system and maintain certain transmission accuracy and operating schedules. Important aspect of the deal is that the CAA assumes all legal liability for the station's operation.

The EAL station, which has been operating for two years, is connected with special arrangements with CAA and FCC, will now be listed as an official CAA station. It will operate at 112 mc., 24 hours a day, and be monitored only except Saturday and Sunday, an Eastern spokesman says.

ATA's Frank White opened the hope that other airlines would work out similar arrangements with CAA for all major airports, and a FAA spokesman said he would probably take such action.

New Rack Designs

Airbus radio sets and their prime components of the future may be designed to use a new type of cooling system in which each component can vent to a common ducting system which pulls cooling air through the units. Douglas Aircraft Co. has been experimenting with such a system for some time. A year ago, and other, an inner manufacturing area reportedly intended, according to A-W's Richard Douglas, began.

The patent convention cooling arrangement is not able to handle growing numbers of avionics equipment which have doubled the amount of heat generated in the radio rack. As equipment temperatures climb, equipment failure rates double.

► Trial to Defect Corrosion—Richard to the AECB he mentioned that Boeing Airlines is going to equip its DC-15 with ducted cooling and he said that all future avionics equipment should be designed for it. A United Air Lines engineer, K. M. Cummings,



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and that UAL expects to equip its DC 66s and Constellation with some type of ducted cooling within the next year.

Richard proposed the use of an air intake vent in the lower front panel of the case, an exhaust vent in the top rear panel, and dampers of existing ventilation louvers. AEEC assembly expressed concern over this approach because the equipment would heat up the constant cooling system failed.

Quick Reconnect Switches—Douglas has developed a new type of switch box which makes it possible to remove and replace a radio rack shelf (and associated wiring) in a couple of minutes instead of the eight hours now needed. Richard told the AEEC: "The new design replaces conventional terminal strips with several small 15-pin connectors."

All main connectors are mounted on one plate, which is used to the shelf. All female connectors are mounted on another plate attached to the radio rack frame. The two plates and their connections, as well as the shelf itself, have quick disconnect-type latches.

Despite its advantages, the new shelf design is actually several pounds lighter than present designs, Richard said.

DME Tests

AEEC by joint decision of its proposed specifications on distance measuring equipment pending announcement of the results of recent negotiations between the Defense Dept. and the FAA to come up with a DME which is compatible with both military and civil needs (Aviation Week 12, p. 7). The committee did last reports from airlines which have been testing several of the present civil airborne DME units. Military Airlines, which made a flexible installation under contract with the Air Navigation Development Board, is currently working on DME testing procedures with the FAA. Meanwhile, B. R. Taylor, chief of AEEC. These procedures will be and only during VFR weather until the procedures and DME reliability are fully established.

■ Maintenance Trouble—Taylor reported considerable trouble initially with the Hinchey type DME units, aggravated by a lack of suitable test equipment. Although some units operated up to 500 hours without failure, service equipment seemed for maintenance came after 10 hours, he said. Malware is currently analyzing some 2,000 position checks on DME accuracy units long known to be defective VFR conditions.

A PanAm spokesman reported that its Federal type D1A unit had racked up 1,000 flight hours and 150 hours of operation to date, with 14 equipment failures during this time, most at

those during the first six months. Pan Am also reported several failures in the Navco type DMC and Bendix type DMB which it recently started testing. TWA reported only three examples of its Federal DME in 3,000 flight hours, while United listed only one failure, but noted that the unit was not used much because few of the routes over which the plane reported were equipped with conventional DME ground stations.

William Canine of Anac pointed out that the Federal DMEs under test in FAA, TWA, UAL, and Capital were very early models and that the GAA set up the DME tests to give operational experience rather than to evaluate the specific airborne equipment.

■ Very Useful: DMEs are very good for obtaining and extremely useful in ILS approaches," B. R. Roshalev of PRA reported. K. N. White of TWA and that DME was very useful for aircraft identification during a radio approach, enabling the pilot to save his descent from the report in DME station. However, AT&T's Frank White warned that the radio controller must still ask for the airplane to make an identifying turn. Other airline executives said it was difficult to get pilots to fill out reports on their DME test observations.

New VHF Spec

AEEC officially approved Characteristic 123-A, a more revision of the previously issued Characteristic 123 which describes an airborne 50-channel VHF communications system (transmitter and receiver) with 500-spacing. The new characteristic now goes up for approval by the Army board and member airlines before being released.

When the airlines are equipped with the new system, the number of communications channels available in the 118-136 Mcz aviation band will be at least doubled. The capacity of present airborne equipment provides a maximum of 50 channels (200 Mcz spacing).

The new 500-A spec provides for three different modes of operation:

- Single-channel simplex (transmitter and receiver on same frequency).
- Double-channel simplex (transmitter 4 Mcz higher frequency than receiver).
- Double-channel duplex (permitting simultaneous transmission and reception with 6.0 Mcz separation in frequencies).

■ Tough Assignment—AEEC took on a tough job when it decided to write 520-A to include sufficient flexibility to enable the equipment to function with a future Air Traffic Control signaling system. The reason is that ATCIS system characteristics are still being developed as a method of ensuring the basis on voice channels by standard

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long many standard instructions from ground controllers in coded pulse form for visual display as a readable cockpit instrument. The pilot will then acknowledge receipt of these instructions back to the ground controller using a similar coded transmission.)

In return for its troubles, AEEC hopes that the 520 A equipment can be used for other vital communications or for ATCSS, thereby saving the airlines from buying special ATCSS transmitters and receivers.

- Special Requirements—Some of the special requirements incorporated in 520 A to meet ATCSS needs include:
- Rapid keying of transmitter to permit

an RF envelope rise time of less than 1.5 microseconds.

- Greater bandwidth in modulation.
- Lower spurious radiation from transmitter.
- Reduced spurious response in receiver.

The 520 A gives the pilot a receiver bandwidth and stability sufficient to permit it to use in VHF network operations where several stations broadcast the same message on carrier wave frequencies not spaced 7.5 kc apart.

The British are operating such networks under the name of "Climax" (Aviation Week June 23, 1955, p. 54)

In the U.S., similar networks are in the process of development for special-use applications. One such network is operating as an enroute base between Chicago and Cleveland, along United Air Lines routes, with five interconnected stations located at Chicago, South Bend and Auburn (Ind.), and at Toledo and Cleveland.

New ILS Plan

The growing number of civil and military ILS installations, particularly in high density areas, both in this country and in Europe, is making it necessary to put into use more of the frequencies originally set aside for ILS. The well known problem for these areas which are still using the older (two channel) ILS systems which have provision for only six channels instead of the 20 channels available in newer ILS equipment.

As a solution to the problem, the Air Force has proposed a plan which calls for:

- Discrete pairing of glide slope and localizer frequencies so that each glide slope frequency is assigned to one and only one localizer frequency.
- Frequency management of some U.S. civil ILS so that all domestic stations will operate on one of six channels.
- Four additional ILS channels to be supplemented for military and foreign use.

The AEEC heard the results of a CAA study which showed that only six existing civil ILS facilities would require a frequency shift under the proposed plan. These are Waco, Minn.; Hartsfield, Pa.; Teterboro and Atlantic City, N. J.; Philadelphia, and New Castle, Del.

The AEEC endorsed the general features of the USAF plan, with the provision that any change in the existing domestic ILS frequencies prior to Jan. 1, 1955, is first coordinated with the airlines affected by the change. After January 1955, AEEC felt that all international airlines operating states that are home channels would be equipped to handle the additional channels where necessary.

The proposed plan has already been coordinated with the International Air Transport Association and will come up for approval at the Fifth Commission on the International Civil Aviation Organization next Spring.

How AEEC Works

The Airlines Electronic Engineering Committee is a 10-man group made up of representatives from 12 U.S. and Canadian airlines, plus one member from each of the following Air Transport Associations: International Air Transport

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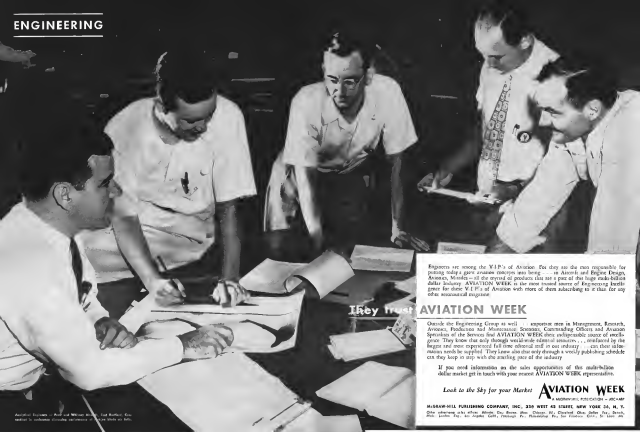
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Arm, Military Air Transport Service, and Aeronautical Radio, Inc. Wm T. Conroy, Jr. is the Assoc representative and chairman of AEEC.

Proposing Specifications—Detailed properties of Assoc equipment characteristics (specifications) or the study of a costly problem is carried out by AEEC administration made up of interested airline representatives working with industry and government engineers.

The recommendations and open discussion by these representatives then come up for full AEEC discussion at one of its three yearly meetings. Members are encouraged to speak out freely,

and these usually reach agreement in AEEC deliberations.

If AEEC accepts a proposed characteristic, it is then submitted to the Assoc board of directors for approval. If granted, it is then submitted to the airline and industry for 30 days. During a mass "squawk," the characteristic is then formally agreed. Population of the spec, from exception to omission, may take a year or more.

Not Binding—Issuance of an Assoc characteristic does not bind individual airline operators to adhere to the spec when they purchase equipment. Rather it is intended to indicate to aircraft equipment manufacturers "the com-

mon interest of the entire technical people, coordinated on an industry basis."

The Assoc spec is also intended to "channel" new equipment designs in a direction which can result in the maximum possible standardization of their physical and electrical characteristics which affect interchangeability of equipment without hampering engineering initiative."

AEEC has or is currently preparing characteristics on such equipment as VHF and HF communications, airborne radar, automatic direction finders, selective calling system, distance measuring equipment and type reproduction.

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SEP-59 FILTER CENTER SEP-59

British Aeropilot for U.S. ST—Officers of British Aircraft Instruments, Ltd., of London recently visited the U.S. to discuss with several manufacturers the possibility of building Smith SEP-1 automatic pilot under license. The SEP-1, which uses magnetic amplifier throughout, has recently gone into production in England. It is slated for use on Coast II as order by British Overseas Airways Corp., as well as for several British military planes. SEP-2 is priced at about \$13,000.

Transistor Handbook—Transistor Application Notes, a handbook written to assist circuit engineers in applying transistors, has been published by General Electric. Copies may be obtained by writing to E. O. Van Dusen, General Electric Co., Rm. 7, Hawthorne Park, Syracuse, N. Y.

New 360-Channel VHF Receiver—Collins Radio has unveiled prototype of its new 31X, 360-channel VHF receiver with 58-kc. channel spacing, at the meeting of Assoc's Airline Electronics Engineering Conference in Kansas City. New receiver, slated for production next spring, is designed to new Assoc 521A characteristic. Unit weighs 27 lb., two pounds under weight of present 160-channel Collins 31X receiver, and will set for approximately the same price as its 160-channel predecessor, a spokesman says.

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a HARTZELL constant-speed propeller was Cessna's choice for their 180



A Hartzell constant-speed propeller in use on Cessna 180.



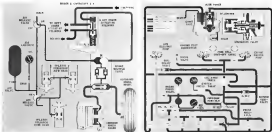
Complexity of design and construction of Hartzell constant-speed propeller is evident in this photograph.

The phenomenal climb and cruise performance obtained from such engines as the Cessna Model 180 results from excellent engine engineering and provision for maximum thrust. Not only is all the engine power made available by virtue of the Hartzell constant-speed propeller, but it is converted into the highest thrust power possible by efficient Hartzell steel blades.

Simplicity, low cost, minimum maintenance and low weight are other virtues of the new Hartzell Model HC-62-K constant-speed propeller. Further, the Hartzell constant-speed propeller for light twin-engine aircraft are also available. Write for details.

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EQUIPMENT



Hydraulic Main Power System Diagram

Backup and Emergency Air System Diagram

Animated Panels Explain Convair 340

The job of teaching new purchasers of the Convair 340 transport how the aircraft's various systems operate has been greatly simplified by the use of an animated training panel.

Designed and produced by Techboard Training Aids, Inc. the set of 16 panels is now readily used to instruct personnel of Philippine Air Lines, KLM Royal Dutch Airlines and Lufthansa Airlines. United Air Lines and Hawaiian International Airlines have also used TTA's animated training panels for 340 instruction with considerable success. American Airlines used the type of trainer to instruct its mechanics on CV 340's several years ago.

► **Clearer Picture**—The animated training aid shows actual physical components of the plane's many operating systems and components, such as door locking, cabin compression system (which includes enlarged mechanical gas analysis in deaerated air, two-speed internal planetary gear train), even its electric power supply, and so on through all the systems of the aircraft. The visual presentation greatly simplifies the tracking and understanding of systems which are sometimes very complex.

The sets are lightweight and small. Each panel weighs about 10 lb. is that whole set of 16 weighs less than 100 lb. Several sets of the animated aids are used by the 340's.

► **Convenient & Inexpensive**—The panels are convenient and inexpensive. Each set is a self-contained shipping container which requires but a few minutes to set up in a classroom for instruction.

Convair says that a complete training package consisting of the necessary number of instruction manuals, slides and charts along with the animated trainers can be supplied at less than the cost of these systems trainers using actual parts.

The animated aids permit more repetition in less time than is possible with the substitution of real parts. Convair also points out. Time saving is largely due to the fact that in the visual training aid, system schematics are simplified, and complicated mechanical functions may be explained to show their function more clearly than if the actual components were used.

► **Adaptation**—The 16-panel set is what you need for United Air Lines and Hawaiian Airlines to use the aids.

► **UAL**—D. S. McDaniel, technical training manager at the airline's main base at San Francisco, points to the system of the maintenance instructors, the trainers—were definitely of great help in the conduct of the CV 340 training program. The comments from the trainers who took the training program were almost unanimously complimentary.

► **RNE**—W. C. Mace, superintendent of training at Dallas, notes that the panels compel the student to understand the system's operation, which is a great advantage in the present.

Following machine training is simplified because new and old students can use the same panels that were used during original maintenance course. Mace says. Also trouble-shooting manuals based on each mechanic's own maintenance experience of the aircraft are in use.

► **Adaptation**—The 16-panel set of the system schematics enables the student to understand the system's operation, which is a great advantage in the present.

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(partial acts were made up in seven weeks) include door and slatting system, cabin temperature control system, cabin pressurization control system, wing and empennage anti-icing system, cabin temperature control system, generator control system, de-ice power supply system, hydraulic main power system, brake and emergency air system, nose wheel steering system, main entrance door and slatting hydraulic system, main landing gear system, wing flap system, ground cooling system, and windshield wiper system.

Technical Training Aids, Inc.'s head quarters is in Tulsa, Okla.

Fire Safety Bettered In New Turbine Units

Two new gas turbine auxiliary power units put out by Allison Research Manufacturing Co. enclose hot parts of the turbine and waste heat in a permanent shield for better fire safety.

One unit is a 170-pounder, whose function is to supply compressed air. Output rating is roughly equivalent to 170 hp. The other turbine supplies both compressed air and shaft power with a total output of about 220 hp.

Stainless steel and aluminum casings have been eliminated in both

units, but they remain fully automatic, self-contained machines. Elimination of casings reduces weight, increases machines' rate of maintenance, simplifies maintenance and reduces operational problems induced by vapor lock, Allison says.

Don't require seal need for sealing status or fuel-flow equivalent are eliminated by use of single combustion chamber. Flame tube may be taken out and turbine section inspected by removal of a single clamp.

Reinforced Plastics Make Tray Carriers

Reinforced plastic food tray carriers are replacing wood-lined aluminum cans on American Airlines' fleet of Comets.

The new units are lighter, cheaper, simpler and stronger, according to American Cyanamid Co., which makes the Lamsar polyester resin that is used to make them.

The new carrier weighs about 15 lb., three pounds less than the aluminum units. Their design permits them to do the job of four, so total weight saving is about 27 lb. per plane. AA estimates that this weight saving amounts to about \$14.78 per pound per plane per year.

The carriers are of single-wall construction. Fabricated almost entirely by molding, they are simply built and sold. Only added parts are stainless steel hardware and four molded glass and plastic dry-ice containers. The latter are attached to back of back wall and to the inside of the door.

Being made of Lamsar polyester resin and fibreglass, the carriers have good impact resistance to dropped, withstood shelling, heat, moisture, frequent sterilization washings, etc. They also have good sanitizing properties.

The carriers were developed by American Airlines and Reinforced Plastics Manufacturing Co., Glenside, Pa. A. I. N. Y. The latter also distributes the units.



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New Oil Additive Inhibits Engine Rust

A new, rust inhibiting oil additive, particularly indicated for use in internal combustion, jet, diesel and gasoline engines, turbines, pistons and various tools or components in the production stage, has recently been put on the market in commercial quantities by the Atlas Powder Co.

The firm says that the inhibitor, Alget 100, "provides freedom from peroxide, wax and other undesirable effects of oily residues encountered with ordinary lubricants containing the salts of such metals as sodium, calcium or barium."

Alget 100 is a rustless, moisture loving and odorless to Atlas' Super 54, used in many military applications. The inhibitor prevents oil, however, that the new inhibitor's "performance and economy" show substantial improvement over Super 54 under many conditions.

Shipped as a concentrate for the 32 times or more to be sold in its oil, the inhibitor has been put through extensive laboratory tests. These tests show that Alget 100 provides improved protection even when used in reduced concentrations and that it gives consistently rustless action, Atlas says.

In a standard humidity cabinet test, Alget has withstood 634 hours' exposure at 8% concentration in oil, or easily double that obtainable with earlier inhibitors, the maker claims. The new product also behaves well in highly reduced oils which tend to coat the action of inhibitors.

Samples and literature are available from Industrial Chemical Dept., Atlas Powder Co., Wilmington 99, Del.

OFF THE LINE

Lockheed Aircraft Service-International, N. Y., has leased 50,490 sq. ft. of hangar and shop space from National Airlines at N. Y. International Airport (JFK). Additional ramp and apron area totaling 127,000 sq. ft. will be complete on grid at 18,000 sq. ft. has also been leased by LANSI at the facility.

Northwest Orient Airlines is re-engineering seven CR-2 models of the Pratt & Whitney Aircraft R4550 engine on its Boeing Superfortresses to demonstrate all this model of the engine with its increased cylinder bore area (providing better cooling) and improved exhaust system design giving greater engine output potential. Should replace the B-4 version of the engine now being flown by NWOA. Service tests will be completed in about six months. If successful, the CR-2 will replace the B-4 on an attrition basis.



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NEW AVIATION PRODUCTS



Small Compressor for Pneumatic Systems

Rhodes Lewis Co. announces production of a high-pressure die-cast aluminum compressor which reportedly provides a complete, self-contained air source for pneumatic systems in aircraft. This compressor is used in Lockheed, Martin and Grumman aircraft, the company says.

Affording space and weight reduction, the unit forms an integral package, enclosing all accessories and controls. It is designed so a technician in maintenance and a pilot can be removed or installed in aircraft in under five minutes.

Manufactured in a hydraulic model as an example of compactness of unit. The compressor's capacity is 3 cfm at 3,000 psi, but it weighs only 25 lb and complete package fits into area 16 in. in diameter by 11 in. high.

Strong in weight and bearing load is offset by cross-rod connection between two sets of opposing valves. The shims have two connecting rods for the four pistons. Further saving is permitted through use of a planetary reduction gear, used between drive motor and compressor.

Rhodes Lewis states that piston length to stroke ratio is held to a minimum. Smaller rings permit use of shorter length cylinders, does not cause concern when using cross-rod design creates piston length equal to length of valve valve assembly.

Metal-to-metal seals are used between cylinders, valve plate and cylinder head in all four stages to insure space requirements. Inlet and exhaust valves also feature metal-to-metal seals.

Manufacture reveals that current production is limited to die casting.



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Frequently used in the de-icing or cable-heater systems of larger aircraft, the Aerotec P-904 Type Pressure Switches are also utilized to control ground heating blowers as well as flap, landing gear and stall-warning devices.

Among the aircraft using Aerotec P-904 Type Pressure Switches are: Boeing B47 Stratojet and B80D Superfortress, Grumman X-46F, Douglas C124C, North American A4-1 and Cessna C125B. More than 15,000 units are in service today.

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phases and shut valves in the motor.

New bearing system in turbine control is lubricated to, grease used to last 60,000 times longer than any previously used. Motor is externally cooled through double-end ventilation system. Air is drawn in from beneath lower end of motor, through baffled air passages and out through on sides of frame.

Larger, integrally cast rotor frame increases cooling air flow through motor and reduces rotor heat more effectively. GE engineers say that through new cast-steel and frame design, protection has been increased by 60% on the drop-proof enclosure.

New brush saw a big consideration in the motor design. GE says that the mean level of the new 10-lip system now tests as low as the former 2-lip model.

Improved maintenance features, in addition to the long-life lubricating grease, include permanently sealed, non-welding connection leads, larger diameter split motor base, knuckle legs on end shields, and location of construction materials connection to motor directly over base.

GE emphasizes that although size, weight and design have been distinctly changed, the T-24-15 line has high efficiency and will operate under greater full-load speed conditions than the former design.

The motor will be available in 182 and 194 frame sizes (1, 14 and 2 hp at 1,500 rpm) in horizontal, drop-proof and totally enclosed fan-cooled models, and a complete line of gear motors. Larger frame sizes will be put out at regular intervals.

General Electric Co., Small Integral and Medium Induction Motor Dept., Schenectady 1, N. Y.



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Weld time is shortened with this portable spot welder which has its own electronic timing control installed. It offers time in 1/16ths of a second to a full second, has output of over 100 lbs. Final gap case enclosed position welding. It welds most alloys of aluminum and various forms of steel, including stainless. The unit weighs 44 pounds up to 1715 lb. and weighs 35 lb. Made by Ampcor Products Co., 1737 W. 57th St., Oak Lawn, Ill.



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AIR TRANSPORT



TWIN-ENGINE PIASECKI HO4S helicopter would handle scheduled air traffic, team up with lighted fixed-wing transports.

Carriers Outline Helicopter Requirements

- Airlines want realistic safety, 30-place craft.
- Piasecki cites twin-rotor reliability, performance.

By Leo Mason

Principal design requirements for a pricing helicopter operation are realistic safety regulations and a payload of 30 or more passengers, discussions before the American Helicopter Society's southeastern regional meeting reveal.

Lee Douglas, engineering vice president of Piasecki Helicopter Corp., presented a detailed analysis of commercial rotor development trends and projected problems.

Capt. Byron Moe, operational planning director of Allegheny Airlines, outlined local service requirements for a self-supporting carrier.

► Engineer's View-Douglas' paper also details that a twin-engine helicopter will be safe and economical if the time



LARGE CAPACITY of HO4S is emphasized in view showing three seats stowed inside.



UNDERGOING TESTS, THIS is a picture of future large disk-type copers.



BLIND HOVERING requirements could seriously hamper payload-to-power ratio.

overhaul equipment is a single engine climb of 300 fpm, rather than a demand that the craft be capable of sustained single engine hovering.

Proper helicopter design and tailrotor techniques will make 100 fpm a safe minimum, he says. The issue of hovering equipment would not get tied to power ratio almost in half.

The Douglas people, Skatka and Helicopter-Air Engineer's View, highlights

- **Load power ratio.** Useful load ratio to military power for new two-engine helicopter is not substantially different from light-powerful, single-engine craft. But two-engine copers' single engine performance safety factor will govern its commercial economics.

Douglas notes that Los Angeles and New York Aeronautics have established safe limits for single-engine copers. "It is thus possible to set operational requirements

that would be more economic than a new helicopter designed to optimize traffic considerations," he says. Backward safety over situations permit safe handling with one engine out by slowing down forward to land at the original takeoff spot.

- **Idle noise.** Forwarder will stand a higher noise level in a 15-min. cabin flight than during a 3 hr. flight in forward transport. Cutting engine noise level 10 decibels in the 1,000 cycles/sec. frequency range would cut about 150 ft. of resolution.

• **Vibrations.** Greater attention to enter requirements, plus actual frequency, harmonic natural frequency and engine vibration will be needed to reduce copers' vibration much below present levels.

- **Radio.** Presently installed equipment has enabled today's wing aircraft to get local all required altitude minimums, so engineers believe that no serious communication problems should be anticipated in interpreting helicopter and airplanes in busy airport traffic operations.

• **Obstacle noise.** Most source of objectionable noise is the engine exhaust. Obvious solution is muffling, which reduces weight, power and drag penalties. Muffler now being developed for the H-21 will have a back pressure of 6 in., weigh 150 lb., and reduce noise 10 to 15 decibels. This changes the noise from an unacceptable to an acceptable level, Douglas says.

- **Speed.** Forward speed does not improve short-land copers' block-in-block time much but is an important factor in making helicopters against headwinds and when flight distances are increased. Speed of 175 mph is well within range possibilities today.

• **Airbus Requirements.** Capt. Most wants the type copers' Airbus design. • **Operating cost.** of \$1.20 per gross-mile on flights of 50 to 75 mi.

- **Payload of 25-35 passengers.**
- **Range of 100 mi., carrying adequate fuel reserves and maximum payload and making an intermediate stop.**

• **Helicopters are requirement of 300 to 400 ft. square (50,000 to 100,000 sq. ft.).**

- **A 150 mph. speed minimum.**
- **Aeronautics meeting Civil Aeronautics Administration's transport safety criteria.**

• **Handling** will be pronounced necessary and proved effective.

• **Engines** should be left up to manufacturer selection, but authors will require single-engine performance must exceed level flight at reduced speed.

• **Indemnification** about the same as in existing planes. Indemnity and as an annual choice, but all weather capability probably will be required.

• **Ventilation and cooling** will be vital, because of the copers' "hot" low-level, up and down nature.

• **Noise control** is a must, because the

noise possible of copers have ratings is movement in and out of crowded, downtown terminals.

- **External appearance** of the copers should not "behave, confuse and frighten" customers.

• **Stability Problems.** Capt. Peter Torrey of the Navy's Bureau of Aeronautics said that the helicopter design should be designed to compensate for inherent stability above all other requirements.

He cites Navy's subsonic aircraft requirement for a copers is that the rotor at 50 ft. altitude through all weather and around the clock. No full copers in production—both or without helicopter—can do that, he says.

Capt. Most said that local service copers can meet the same requirements of stability as Navy's specialized subsonic water-lifting requirement.

"We don't discard the acoustic noise requirement," he says. "The rotor's not put price copers on that."

Physicists say a simple helicopter can achieve stability and reliability, as shown by the record of its HUP equipped with a Sperry A-12.

Brazil's Airlines Ask Rate Increase

(McGraw-Hill World News)

San Paulo, Brazil—Brazilian airlines have told the government they require a minimum 70% increase in fares to stay in business.

The means, increasing wages, higher cost of fuel, increasing in domestic income in cost of aircraft, parts and equipment.

Several foreign carriers—including KLM Royal Dutch Airlines and Air France—reportedly have losses in 1955, but the director of Brazil's Civil Aeronautics Department says he is in favor of any authorization permitting these companies to increase fares since in Brazilian territory.

Experts Study Runway Economies

Substantial reductions may be possible in airport construction costs by making the shoulders of runways thinner than the more heavily traveled center portions, reports the University of California's Institute of Transportation and Traffic Engineering.

Analysis of 750 landings and takeoffs at Oakland, San Francisco and Los Angeles Airports is being conducted by the institute to determine whether phone made much use of the money elsewhere.

BRAIN SURGEONS...

FOR GUIDED MISSILES



Guided missiles are, fundamentally, planes without pilots. Officially referred to as "pilot-less" aircraft. But, something must take the place of the human element to make the missile work—to fulfill its mission.

The problem of developing that "something"—a replacement for the pilot—is a challenging assignment for highly trained scientists and engineers such as the "brain surgeons" of Bell Aircraft's huge and diversified electronics and servomechanisms departments.

Complex electronic systems are the "brain" of a missile. Servomechanisms provide the "muscles." Development of successful "brain-muscle" systems is typical of the advances made by Bell Aircraft engineers for our armed forces.

Bell's electronics and servomechanisms personnel also include design and production of various types of radar, program and control equipment, instrumenting systems, automatic landing devices and several different types of autopilots.

Through research, advanced engineering and sound production which change the Bell products will provide major contributions to transportation, communication, industry—and the future defense of our nation.

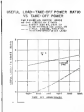


Buffalo, N. Y. Fort Worth, Texas

Experts wanted to come opportunities—some Engineering Personnel Dept., Buffalo



OPERATIONS GRAPH shows noise levels (db) and lift-off performance comparisons.



Turbines, Low Fares Spur BEA Business

A combination of tourist fares and the introduction of turbo-prop powered Vickers Viscounts on British European Airways Corp.'s most competitive routes have produced sizable gains in passenger traffic.

• **London-Guernsey and London-Zurich**—7,600 passengers in September 1955, compared with 3,116 at the same month a year ago.

• **London - Stockholm - Copenhagen**—3,847 passengers, against 1,563 flown in September 1952.

The airline still operates about 300 speed Aerobondor Ekimethan-class piston transports on Swiss routes.

ICAO Names Loezae Air Transport Chief

Dr Enrique M. Loezae, Mexican representative on the International Civil Aviation Organization's Council, has been appointed chairman of the Air Transport Committee.

The committee is a subsidiary body of the Council and deals with any issues or problems of international air transport.

SHORTLINES

• **Air France** is operating both Turbo Compressor Super Constellation and regular Constellation on its new Chicago-Turin service (Aerolinee World Sept. 28, p. 50). Company says the service cuts several hours from routine routing via New York.

• **Air Transport Assn.** has published its *Origination and Destination Airline Traffic Survey of Revenue Passengers of September 1955*. The four volumes: 1, Summary of Domestic Traffic; 2 and 3, All Domestic Airline Passenger Traffic Between Terminal; 4, International. Sets cost \$25.

• **California Air Service Co.** has started an bus and air ambulance service from Oakland Municipal Airport with two Hawards, a Stinson, Avianca and Cessna.

• **Civil Aeronautics Administration** is experimenting with a new commercial pilot examination: It poses practical operation and navigation problems with reference material available, instead of questions and answers that can be memorized. CAA says it will decide only next year whether to adopt the new exam in the standard. CAA reports the number of aircraft fix postings by air route traffic control centers increased 13% from fiscal 1952 to 1955 with 12 of the 58 ATC centers handling more than 500,000 postings in the year. Nine centers Atlanta, 25th, Indianapolis, 19th, and Los Angeles, 23rd. CAA has issued its 1955 revised handbook on civil aviation—the first published in two years. It covers passenger, airframe and other related statistics, airports, federal aviation records and service certificates, general aviation, economical problems and reports and accidents. Cost is 40 cents from the Government Printing Office, Washington, D. C.

• **Northeast Coast Airlines'** around winter schedule gets Shinkansen as Chicago-Turin Office and Chicago-Salt Lake City.

• **Trans World Airlines** has bought 13 complete passenger-carrying cars for conversion of four-day Constellation to aircraft passenger service. TWA is to buy bought 12 sets passenger-carrying cars for each conversion.

• **United Air Lines** plans to build a \$450,000 office and remodeling building next to executive headquarters in Chicago, has scheduled it for completion in July of next year.



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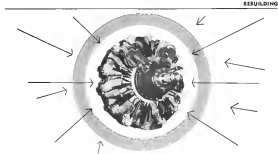
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Competition for the 'Fast Mail'

"Why give the airlines more mail?" asks a headline in *Travel & Travel* magazine, over an article denying the current thousand-mail trials.

"The public is getting faster service," is one answer. Or do the rub deny that's a virtue?

Officials Break Security Too

Those of us in the press who face difficult decisions almost daily as to what to print and what to include in the best security interests of the country are sympathetic with Air Force Secretary Talbott's apparent uncertainty in Madrid.

British and American press associations view, as well as special correspondents, said he told a news conference that the United States planned to store atomic weapons in Spain eventually. Later, Mr. Talbott denied he said it.

The most revealing statement of several that were released immediately afterward in Washington was that of Secretary of State Dulles—"If and when we have plans for storing atomic weapons, we shall not announce them publicly to the world and to our potential enemy."

We have a right to feel that the Secretary for Air should know security.

But even even of Cabinet level, and high military officers, fumble on the subject from time to time, with the risk of us, and the record shows they have committed security breaches that were whoppers—some more serious than anything the press has ever committed.

The problem of what information can be discussed safely will always be with us. Too often in the past, government people have tried to maintain the attitude that security breaches mainly were offenses by identity or guess. We consent, respectfully, that that is not by any means always the case. Madrid, for example?

'We Saw It Happen'

United Aircraft Corp. has produced a feature-length motion picture "Depicting the race, the trials and the events in the fifty years of powered flight." Previous have been shown in New York, Washington, Hartford and Dallas, and the film is being edited for further exhibitors.

Any such enterprise is difficult, and the producers here were confronted with acute problems of judgment in deciding what to include, omit and edit, and how to prioritize the elements to convey the most authentic, interesting and comprehensive story.

Despite these problems, and with the knowledge that no such ambitious product can please everyone, we feel that United Aircraft has performed a valuable service to aviation, especially in dispatching its camera crews all over the country to interview some of the oldest living pioneers in aeronautics.

These men, of high and low stature in life, tell the stories of the parts they played in aviation history with as ease and enthusiasm that is seldom seen in the movies these days. These simple interviews of the old timers are not only absorbing stuff for those of us in aviation, they are a valuable and lasting contribution to aviation history.

Fewer Free Rides

An indignant reader takes *Aviation Week* to task for recent publication of a letter from a Civil Aeronautics Administration agent. The letter, accompanied by a facsimile of a government transportation form, contended that CAA agents alone check tickets, which they sign themselves to obtain free transportation on the airlines, entitling to carry out their CAA duties. No check was ever made by CAA on the need for such travel, it was claimed.

The reader outlines as for: (1) Publishing an "unsubstantiated" letter; (2) permitting such an attention to be published; (3) not investigating the veracity of the writer's statements.

We have told the reader that: (1) The writer signed his name to the letter but that we checked it for his personal protection; (2) we know the writer, and his past reports had proved accurate; (3) the accusation was investigated and the agent's contention was borne out by other CAA personnel.

We also told the critic that a few days after *Aviation Week* appeared with the letter, a spokesman for CAA telephoned to thank us for publicizing the matter. He reported that all of the forms were being called in to regional offices where such tickets will be considered before release. "Any overused copy shown away would be caused by the agent and supervisor," CAA says.

Let's Outlaw Confusion

In an effort to ease public confusion, the Civil Aeronautics Board has ordered North American Airlines—a needless—no discrimination in name. It strikes on American Airlines' rights, the majority held.

For years—until recently—All-American Airways operated under that name, and there was confusion, but CAB never did anything about it—nor the "infringement."

We now await the fireworks that will let us know CAB starts similar action against Pan American. More confusion. More infringement.

And while the Board's easing public confusion, we wish they would see that Seaboard Air Line Railway changes its name immediately. The confusion on this one is terrible, and the misdeeds use of the words "air line" infringe on aviation.

—Robert H. Wood

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TV-2 trainers. Through Allison engineering, these engines have established records for dependability and long-time operations as proved by an Air Force technical order permitting 1200 hours' operation between major overhauls.

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